THE PAPEZ MEMORABILIA - Bethesda - January 30th, 1981

Paul Yakovlev

K.E.L. - Can you give us some background on your early experience in Russia - and your medical training in particular?

P.Y. - Well, I went to the Military Medical School in Petrograd. It was not different as far as curriculum is concerned from European and North American Medical Schools at that time. The relationships between faculty and students were on the same order as those prevailing in Germany.

The earliest influences in Russian Medical Education were strongly French. This was in the middle of the 19th Century - the 1840's and 50's. French was generally the language of culture. A person was considered not quite educated unless he could speak French. This became less marked in my time but of course still persisted. French was an indication of intellectual polish, but German was the language of pragmatic science and technology. A physician who had special status would have had his post graduate training in Germany or Austria in my time, rather than in France. That was true except in some special fields - bacteriology for instance where the Pasteur Institute was very prestigious. In fact there was almost a colony of Russian scholars - Emigres who clustered in Paris - Vegnekov, Metchnikov, Matanokov all of whom were bacteriologists clustered around the Pasteur Institute.

K.E.L. - Who was the Scotch Physician involved in the development of the Medical School?

P.Y. - That was Sir James Wylie - he was the official founder. It was a School of Medicine to provide physicians for the Government. The major needs of the government was for physicians in the armed forces. Wylie was knighted by Queen Victoria early in her regime on the occasion of the visit of the then Emperor Nicholas. He was the first Tscar to visit England - the great great grandfather of the last Emperor. Wylie came with him. This was the

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Nicholas of the Crimean War. Wylie was knighted before the Crimean War of course. The visit was an exchange - one of the early summit meetings - Lord Beaconsfield on the part of the English and Nesselrode for the Russians. He was apparently a Baltic German serving in the Russian Court. He served for 40 years under the reign of Alexander during the Napoleonic Wars. James Wylie was of Scottish origin and had been a pupil of William Hunter the Surgeon, brother of John Hunter. Wylie was engaged as a regimental Surgeon for a regiment of artillery and cavalry of perhaps 10,000 men. The titular head of this Division was of course the Grand Duke Paul, who later became Tsar Paul the First. The Empress Catherine whose unfortunate husband was disposed of early by court intrigue was a German Princess who became Catherine the Second.

So the future Sir James Wylie came to St. Petersburg as a young regimental surgeon. He didn't change his nationality. There was no difficulty over that in those times. You were accepted from whatever citizenry you came from as long as you were a gentleman, which was taken for granted. There were international relationships in the pattern of the 19th century. Many foreigners were invited to less technologically developed and industrialized countries. That certainly applied to Russia at that time. Wylie arrived in Russia in 1894 as regimental surgeon to his Imperial Highness Crown Prince Paul, so he was knighted after he had been in Russia some 45 years. Paul had his Palaces away from his Mother's. She lived rather longer than Paul thought was right. There was a conflict of interest. We thought she should have retired to let him reign. Paul was already in his 50's. His Palace was in Katchinaw some 30 or 40 miles South of St. Petersburg.

The story goes, though I think it may be somewhat doubtful about how he became so eminent as to found a medical school and be knighted by Queen Victoria. The story goes that Count Kittsoff the favorite of the Crown Prince Paul and his representative in all of the diplomatic relations with the Imperial Court, and manager of the Imperial Village - the Versailles of St. Petersburg. Kittsoff was involved in the planning and construction of the various palaces and buildings and houses of different rank for members

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of the Imperial family. All of this was patterned on the Court at Versailles but the content was very Russian. According to the story Count Kittsoff developed a retropharyngeal abscess that was treated by various methods including bleeding, all to no avail. In this desperate situation the young surgeon James Wylie was called in to see this dying, suffocating favorite of the Court. Wylie simply asked for a basin and told the attendants to turn the sick man face down over the basin. He may have brought some sort of instrument or just used his finger after putting a block of wood between the patients jaws to avoid being bitten. At any rate he managed to evacuate a great gush of pus. The patient got blue and almost suffocated but with this great mass of pus removed the airway was clear and he could breathe. It was clear that his life had been saved by this maneuver. He was immediately apointed Surgeon General to the Imperial Army and Navy in 1799. This Scottish batchelor surgeon remained in Russia until his death in 1854 at the age of 86, on the eve of the Crimean War. In 1779 there were medical schools for surgeons who would let blood and who had to amputate legs and arms in the campaigns against the Turks and the Serbs. My Great Grandfather graduated from one of these schools in Moscow. The school in St. Petersburg was designed especially as a base to train other surgeons and in fact to provide Professors for the rest of the Empire, so heavy endowments were provided for it right up to the time of the Revolution. It was continued as the Wylie Clinics where the third year students got their first bedside teaching. I remember all of that system was German. The first two years were entirely basic sciences - anatomy, physiology, biochemistry etc., but in the third year pharmacology and physical diagnosis and general pathology were introduced. In the second year were forbidden to meddle or interfere with any of the clinical activities as we would be in the way.

We were identified by our uniforms as to our level in the medical school. In the first year students had only the emblem of the medical school on their simple epaulets. The second year had a bar in addition on the epaulets. The third year already had military officer epaulets, but the military insignia were not overdone. The active military people were in

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a cast by themselves. Physicians were not in high social standing in those times. In the main hall of the Medical School was plaque with a Citation from an order from Peter The Great as to the disposition of various elements of the armed forces in parades. Of course the Officers of the Imperial Guard were very select - only very notable Aristocrats could be Officers there. Then there were specifications for soldiers who had to be so many feet tall and not too short either. They were handsome and young and had elaborate uniforms. Then two regiments of Cuirossiers with the same uniforms - gold for her Majesty's and blue for Prince Paul's. There was a formal Imperial Edict as to how all these components - artillery, cavalry, infantry, engineers, down to the last one - the least important - the medical personnel. It was specified in the decree "and as to those foul smelling and otherwise disagreeable clyster operators - they have to be put behind the horses of the Commissary so that their uncouth appearance will not offend the sight of His Majesty (Tsar Peter the Great)." That was used as a souvenier for the medical school. The emblem of the medical school which you got with the formal epaulets in the fourth year consisted of two crossed letter "P's".

The medical school in the middle of the 19th century in the time of Wylie had become a center for the development of the medical sciences. Sicherov and Pierogoff who was a contemporary of Florence Nightingale in the Crimean war were graduates of this medical faculty. It is interesting that medical practitioners other than surgeons never achieved any particular prestige and were not very widely known. Pierogoff was widely known and so was my teacher of orthopedic surgery John Henry Turner, another Scotsman. I have Turner's biography here in my library. There were always some foreign physicians on the medical faculty. The medical school continued to operate through the revolution, including the Kerensky regime which lasted only from February to October, 1917.

I entered medical school in 1914 and was supposed to graduate in the Spring of 1920, but I was graduated in December 1919. That was a year after the armistice at Versailles. It was in November 1917 that the Russians withdrew from the war shortly after the October Revolution. That was the time of the Brest-Litovsk Treaty.

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K.E.L. - Did that disrupt the school?

P.Y. - No the school continued. There were some things wanting of course because large numbers of the population were simply dying of starvation. There was need for physicians of course. Though Pavlov was an outspoken opponent of the Revolution, he was given the Order of Lenin and provided with special protection.

I was supposed to receive the diploma of graduation delivered by the Chief of the Medical Academy who was no longer called the President. He was the Commander of the Medical School which was under the Department of War or Defense as it would be now. The school was funded from the Military budget and probably much better supported than the public education medical schools.

At that time Professor Mechinikoff was my hero. He was only 29 when he was made Professor. At that time I was to receive a special prize which carried funds known as the Wylie stipend. The policy was established early in the 19th century of a stipend for each class that would be devoted to retaining at the Academy or further perfecting selected students to be teachers in the medical sciences. The stipends were very generous for those times. One of the specification was that each recipient would spend three years abroad including 6 months in Aberdeen, the Medical School from which Wylie had graduated. Otherwise there were no specifications as to where you went or what you did. It provided for a sort of Western acculturation, but after the revolutions February, 1917 and October 1917, the stipends were in name only. There was no money. The concourse, that is the competition was continued. All those who were designated as candidates for the prize by the faculty - whose marks were above a certain average were entitled to apply for the Wylie stipend. The concourse consisted of something like 6 hours of writing a medical composition on certain selected topics. There were 74 members of the class and probably 25 competing for the 4 Wylie stipends. I was fortunate enough to be recipient of one of the 4 prizes.

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Epidemics were widespread and terrible at that time and the question in this concourse was on the development of public health. I only recently found in my papers a draft copy of that essay. It was on public health and the prevention of epidemics. Not much was known in that field except for smallpox. It took about a week after the exams before notification. We graduated on a shortened course ending in December rather than in the Spring. I didn't think I would be successful in that competition because some of my colleagues were really brilliant - some really super. But I was successful and named to receive one of the Wylie awards. The problem was how to do this. I wanted very much to go abroad and I decided simply that I would do it on my own, though there was no money. I thought I would go to Germany - to Berlin to study with Oppenheim and with Kraeplin and others. I expected that during the interval the dust would settle and I would come back equiped with this highest European learning. I would have gone to Paris to visit hospitals and physicians also. I would be free to move. I had no money, but I thought I could always find something to do. There was never any question in my mind that I could do it. The problem was to get the credentials to take with me. The diplomas were all signed and sealed ready to be delivered at special formalities on December 25th, 26th or 27th. The traditions that would be observed were very few. There would be no dinners or drinking of champagne. We would simply appear at the assembly hall arranged in ranks and the secretary of the Conference of Professors would deliver the paper and you would shake the hand of the President or Commandant and it would be finished. By the way there was no longer real parchment. It was merely hard paper on which were the signatures of the Professor in each subject and the marks which had been received. That was it. But if I was to leave I decided not to dally and wait for this ceremony. Since some of my classmates might talk about it or be interested themselves and complicate the planning. I had planned not to go across the formal land frontier but to cross the frozen Northern Baltic. I would take the railroad to the nearest border point on the mainline to Finland and leave the train aiming to cross to the nearest point on the Finnish side of the Estuary of the Neiva River. That line was the main route to Finland and also the rail line for residents of summer cottages

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on the north shore. I would leave the train and cross the ice to get through the line of island fortifications that were across the entrance to the Estuary protecting the approach to St. Petersburg. This was a line of island forts - some artificial piles of rocks with military fortification on top with observation towers and search lights to detect any traffic. Six or seven of them had lighthouses to guide shipping. I think it was about 20 miles across the Estuary to the opposte Finnish Coast. I would try to avoid the fort areas which were about six or seven miles from St. Petersburg. It was about 200 miles from St. Petersburg to Helsinki along the Gulf of Finland which was only about 40 miles wide at its widest point. The whole border from Estonia to Finland was of course closed. We would be arrested if caught and might be shot because as a doctor I was supposed to be on duty at the front.

The problem was how to do all this. First of all I left the school dormitory and went to the house of my Aunt which was quite a distance across the Estuary of the Neiva on the ot her side of Leningrad (no longer St. Petersburg or Petrograd). This was on the opposite side of the river from the clinics and laboratories of the Military Medical Academy. For the first two years of medical school I had lived outside the dormitories as we had more freedom then. The third year I lived in the dormitories for economic reasons because of inflation. Living costs were getting very high. I didn't want to live with relations - the older generation, though their doors were wide open. My Aunt wanted very much for me to live there. In retrospect I am sorry because I know it was grievous for her. My Aunt's house was near a series of barracks of the various military companies and there were also apartment houses in that area. I would visit there frequently especially when the food supply was more difficult and I could have a nice meal with my Aunt. You could sit there in a warm dining room in nice surroundings and a maid and good food. There were lots of us who were cousins, my mother's family very prolific. My paternal cousins were few. My maternal family lived on hereditary estates and had large families. Most of the cousins were older. My Aunt was quite a character. Her husband was the

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Commissioner of wages and communications in the Ministry of Communications. I think his was the Department of Railways. My Aunt was very skeptical about young people. She would say -"now come here, sit down and tell me". She was always busy with embroidery or reading some historical periodical. There was a chair nearby and she would say "sit down and lie something to me". She had a great sense of humor. I stayed at her house the nights of December 26th and 27th. On that day I remember we had a lot of salteen crackers and tea - that was the only food we had. I had gone to the secretary who had all the diplomas signed and sealed and ready to be delivered. I got them I think by proxy for Professor Maximoff. It was about 4 o'clock in the afternoon and was beginning to get dark already. A classmate of mine named Paul must have learned that I was going and wanted to join me. We put our clothing, extra shirts and our papers in a bag. I don't know what he had. I didn't know him very well. He was a Pole from Warsaw. That was part of the Empire and he was a subject of the Tsar. In principle the medical schools were open to all applicants on the basis of competition, but I did not know him very well. He was a man of rather gracious manners and was also a friend of Maximoffs. Maximoff was a great collector of butterflies from Asia and Africa and South America. He was from the family of very rich flower merchants - Maximoff of Moscow.

Well we managed to get our diplomas and put them in our little bags with chunks of frozen lard and black bread. We paid for it in Tsars money. There was still some in circulation worth 10 to a 100 times the Kerensky money. These were the original rubles with the double eagle and all the decorations. They were larger than our bills. The Kerensky ruble was maybe only the equivalent of 5 Kopeks of Tsar money. I had with me 800 Czar rubles.

(paraphrased) There is a break in transcription in which he is describing the trouble they had on the train keeping away from soldiers going through the train to review and question the passengers. We thought the soldiers would get on the rear of the train and go forward so we got on the front and found to our dismay that the soldiers began their search from that end. We kept retreating ahead of them and finally got off the train before we had intended. We had to jump off the train as it was going slowly and then headed in a direction we thought would take us away from the fortications and out onto the ice and across the gulf. We had a compass with us. We were on the shore along which were the summer

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cottages. Each of us had a white blanket which would keep us camouflaged against the snow and ice.

When we came down on the ice the sky was a little obstructed by cloud so we could not see the stars. One problem we did not expect and had not thought about was that near the shore and perhaps for a mile out into the Gulf the ice was badly broken up and frozen again. Walking over these great chunks of ice covered by snow making them even more slippery was very difficult. Frodinski my companion lost his footing and fell smashing our compass. We had thought we were going South but that was a mistake. Some of our difficulty was that we didn't leave the train where we had planned. That would have put us beyond the off shore fortifications which guard the Estuary. About that time the snow began to fall which was rather welcome. Our orientation points simply disappeared. Then we began to see search lights coming from our left. In other words we were inside the line of forts. Sometimes the snowfall would lighten and we could see more but we would have to flop down on the ice and cover ourselves with the white blankets, everytime the search lights swept around. First you hear the motor starting - then whooo----- and the light comes. They were searching the Northern and Southern approaches to Kronstadt which was the Navy base in the center of the fortification line. Then the storm became more heavy and continued for 3 to 4 hours. As it cleared we suddenly found in front of us some hangars - they looked like barns. We were not sure where we were. We expected to go South to reach the land. Was this one of the fortified island or even Kronstadt itself - we were disoriented completely - we didn't know whether we were North, South, or West. We thought we had better hide and wait until morning. This was when we saw the hangars. As we were turning the corner around one of these structures we suddenly came face to face with a sentinel and were directly in front of him. We were absolutely stuck. We said we were on furlough from studying in Lenigrad and were trying to cross the Estuary to get where the cottages were and we got lost in the storm. No that was not it - we were trying to go to Kronstadt and asked the sentry to direct us to the command post - will you please tell us? I really forget how it was - we were so close to him. He just took a turn and with his hand said - "just go around this barn and at the next building you will see a light in the window and you will be there. This meant that we were on the Northwestern most point of the island. So we turned that

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corner and went away very quickly. We crossed an open field and came to another rather ramshackled building. It was partly falling down. We opened the door and peeked in to find it was full of barrels. They looked like cement barrels but they were empty - at least they looked so. We decided that it would be best to spend the rest of the night in this building, then in the morning with some light we can orient ourselves, otherwise we do not know which way to go. So we spent the night. We ate some of the frozen lard and bread. I did not want the Vodka. I was note sure it would help me and we might need it more later. I don't know whether we slept, but we got through the night. That was one of the tough moments, when dawn came about six a little dog sauntered out and stuck its nose into the door, sniffed and looked around at us. I was afraid it would bark and give us away. Finally she trotted off. Finally came the Sun, so we knew at least where East was. That was the direction of Petrograd. We could see the Cupola on the Kronstadt fortress. It was guilded with gold. It was about three miles away. There was also the spiral of the Church at Sesovitch - the village at which we had planned to leave the train. So that was North. The ice out here was very smooth, but the rocks along that shore were very rough like the coast of Maine. If we went out on the ice in this light we could be seen for miles. It was a bright day - so we stayed in the barn waiting for darkness. By the time it began to get dark the snow came heavily and we were afraid we would get lost again - we had broken our compass and because of the storm could not see the stars, but by 7.30 the storm had gone through and there was clear sky and a moon, so we started out planning to go straight West for 4 or 5 kilometers. We were keeping not too far from shore but far enough not to be conspicuous. This was now the 28th of December. Now and then there would be flurries of snow and it would cloud over. Later we heard some noise like cannonading when we were near the shore. We knew there was some English General trying to get at Leningrad. He was coming up from Estonia. We thought there must be a big battle going on along that South shore. The ice here was very black and swept clean of snow. Cracks in the ice made great booming noises. Our plan was to go 5 km. or so Westward - straight West on the ice. It was the 28th of December - my birthday - I was 25 - so we walked and walked

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on the clear ice now and then it would cloud over and the snow would blow but we made good speed. Sometimes we would hear from the South the cannonading of big guns. We knew there were some English troops with a Russian General - Eugenovich - trying to get at Leningrad from Estonia. The great cracks in the ice were also making great noise. The cracks were running randomly. Once the crack came right past us and there was actual water spouting from the crack. So we were close to the open water of the Baltic because near the Finnish shore it will be frozen solid all the way across. But in the middle zone out toward the Baltic it might be only partly frozen or actually open water in places. Then it would freeze solid again along the coast, especially along the "Shaires" (?) a chain of small islands like the thousand islands stretching along the Finnish coast. At this point we were far out toward the open Gulf and would have to change direction. So we decided to stop and rest at that point. It was the middle of the night or maybe as late as two or three in the morning, so we scraped a little place in the snow drifts to lie down. We decided that I would sleep first, then he would wake me up, and we would change. This was early in the morning of the 29th. I remember he said it was now time to take a little of our vodka so we got the bottle out. It was a little yellowish - my friend had put some herbs in the bottle before we left and this produced the yellow stain. Anyway he took the bottle and went gulp, gulp, gulp - we had frozen lard and black bread, then I layed down and fell asleep. He woke me up just as day was breaking in the East. It was not yet sunrise but the sky was changing and becoming lighter, so it was his rurn to sleep. Later when I tried to waken him, I remember he was very sound asleep. I was a bit alarmed, but I managed to shake him awake but had to finally pull his hair to get him really awake.

We heard dogs barking in the distance and thought we would go in that direction toward the shore.

K.E.L. - Did you think then that you were in Finland?

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P.Y. - Well we had to take a chance and hope that we were. We were pretty sure we were beyond the fortifications of the frontier. We were really fasting. I remember I felt awful but he was full of pep - now the night before he was dragging. He seemed then to be completely exhausted. As we came closer to the shore the snow was deeper. It was hard for me dragging myself through that rough ice and snow near the shore. Then in the distance we saw a small house - there was a tall post beside it - a flag pole, but no flag on it. Well it wasn't a flag pole it was a water well. At the top of the post was hinged a long thin tree and at the end of the tree was a bucket on a rope. It works like a lever - if you pull on the rope the bucket will drop right down in the well. In the winter of course you have to break the ice - throw in stones, etc. Well this whole structure was fairly high so you could see it from a distance. This well sweep was just in front of a small stone house with two small windows and a door facing us. Well that is where we had to go. I was dragging and felt sick - I didn't know what had happened to me.

K.E.L. - Were you salt depeted?

P.Y. - Well perhaps but why should we be depleted of salt - I had lard.

K.E.L. - Yes, but there is no salt in lard.

P.Y. - Yes, but this was salt cured - no you will see what happened. The yellow in the vodka was cocaine, so that when my friend drank it he felt good, but for me it was just complete disintegration. At that point I could hardly walk because we had been wading through deep snow. Now we were close enough to see the well and the stone house and as we came closer still the door opened and a man in a gray uniform which was not Russian appeared in the doorway. That

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was wonderful to see. There was one great risk you know - that they might shoot thinking we were spies, or that this was a flanking movement by the Russians from the sea. But the man opened the door. He had two buckets and was going to the well, when he saw perhaps three hundred yards away two figures in Russian uniform. He turned and ran back into the house and in a matter of seconds a dozen men with rifles came out of the building - all in uniform. He came toward us - we stopped. This was hardly a threatened offensive - these two bedraggled men. They surrounded us and told us to get inside. We went in and somehow an officer appeared. I didn't know where he came from. I just flopped in a chair next to the table in the office. This was obviously a guard post.

I fell asleep right there and don't remember anything - Rodjenski (?) my companion was talking, I recall. He was really talking. After a time when I opened by eyes there was in front of me a man in Russian uniform. It was a Boxer's uniform which was quite distinct, but it had some Finnish emblems on it. He was very thin.

There is a break in the recording here - it continues-----

K.E.L. - Then from Finland you travelled on a League of Nations passport?

P.Y. - No, not exactly. It was simply a certificate not an actual passport. I had certain identification but no existing government represented me. That was a little dangerous of course.

There is a break in this section of the recording. He comes back to it in a later session - about his crossing the Baltic and North Sea to London and then to Paris. His companion on the boat from Helsinki to Hull, England was a Naval Officer from Italy - a huge man whose full identity Paul did

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not discover until 10 years later. This was in the pre-Mussolini era and I am sure the officer was of some later importance in the Mussolini regime. This man had been Naval Attache probably in Helsinki and was returning to England. Paul tells an interesting story about this man displacing him from his lower birth on the boat - simply saying he was too big to get into an upper birth. He tells about being taken by this naval gentleman to a bar in Hull while they were waiting for the train to London. Paul described being quite mixed up about social behavior since they were surrounded in the bar by a group of prostitutes. One of them became very angry with Paul because she thought he had insulted her by showing no interest in her professional capabilities. This was something he had had no exposure to during his rather sheltered life in Russia. He was distressed at the time, but he went on to London and thence after an interval to Paris.

The section on his trip from Helsinki to Paris did turn up on another tape and is included now.

K.E.L. - How did you get from Helsinki to Paris?

P.Y. - Well, of course the Soviet government was not yet recognized internationally. Russia was still officially at war with Finland. The Finnish defense was under the direction of General Mannerheim. The consular services of the old Czarist regime in Finland and Denmark and Poland were still in operation In Germany however, there was already a Soviet Bolshevik mission in Berlin. I don't remember who was the first Ambassador. As I recall Germany was the only country that recognized the Soviets at that time and established diplomatic relations with them.

It is now January, 1920. I left Petrograd on December 27th, 1919. We were then in Helsinki. In Helskinki there was a Russian representative of the Emigre Committee. The man who happened to be the head of that Committee or Consulate was an old acquaintance

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of the family. He was of French origin and was a teacher at one of the high schools in St. Petersburgh. This Committee was certifying that this or that individual was known to the Committee and was bona fide. Thus I was Paul I. Yakovlev, a Russian subject, emigrated on such and such a date. He has a diploma from the Russian Military Medical Academy. That was the only document we had.

After I got this Certificate I applied through the Italian - I applied to the German Consulate in Finland. Finland and Germany were of course allies, though Germany was no longer at war with Italy. Mannerheim was in charge of Finnish Forces.

I had in the few papers I could bring out, a letter from my Professor of Neurology. It was a clandestine letter. It was important to destroy such letters because if discovered they would produce trouble for him in Russia. I believe the letter I wrote was sent to Oppenheim attesting that I was a young graduate student interested in neurology - asking for some attention and interest in my welfare.

So that letter went with my letter of application - mailed in Helsinki in January, 1920 within about three weeks I received a reply.

PAPEZ MEMORABILIA

Paul Yakovlev - January 30th
February 1-2, 1981

K.E.L. - Tell me a bit about what you knew about Papez and how you met him - did you know him before you met in Atlantic City?

P.Y. - Oh, yes. I knew him and knew about him, but had not actually met and talked with him. I described that in my presentation in Toronto in 1976 and in that little section of "Recollections of Papez" in "Limbic Mechanisms" as you know. I think I had actually met him earlier at meetings of the American Neurological Association. He was an associate member or something like that, but the first time I had a real exchange with him was in Atlantic City in 1946.

I had an exhibit at that meeting. That was combined with the first meeting of the Society for Biological Psychiatry. It was Nielson of Los Angeles who organized that. I had a paper on that program and was very offended when they simply informed me that they had no time for that paper. That was very hard you know - but after that meeting I went to hear Papez paper. I think he was talking about the thalamus.

Later I found Papez looking at our exhibit - so then I introduced myself. The exhibit was done with Arnold Friedman who was then at one of the State Hospitals. We had made a series of x-ray films of the whole brain plates. It was quite interesting. We had a nice talk and I asked him if he would be interested in coming to the Fernald School where I had my anatomical material on some of the various malformations that interested me. Also I had a series of slides and sections on the thalamus that might be of interest to him.

He was interested in the thalamic terminals of the mesencephalic root of the trigeminal nerve. He was looking for gustatory pathways - fibers from the glossopharyngeal from the solitary tract nucleus and so forth. I was interested then in the clefts of the cerebral hemispheres - and had material I would like to show him. Many of these brain abnormalities are referred to as porencephalies, but they really are not porencephalic. We commented on this and much to my surprise Papez agreed to come to the

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Fernald School, so we drove together to Massachusetts. He stayed in our house and spent a whole week with me in the laboratory at the Fernald School.

I remember so well, how the children thought they had never had such a fascinating visitor. He was speaking to them at their level - not as a grown up man but as one of them. They were just all tied up with excitement - especially the two older ones John and Anne. Mary Ellen was pretty small - she was only four years old, and Tasha - she wasn't even born. No she was born that April,(1947) and was just a babe in arms.

Well I remember that we spent the whole day in the laboratory. We had our breakfast in the morning then went to the laboratory and worked there all day. I remember while we were working I prepared 10 drawings and sketches for him of pathways that particularly fascinated him. There was the problem of how to identify some of the thalamic nuclei - particularly those in the subthalamic area. We poured over those serial sections together and labelled my drawings. I still have many of these drawings which we marked at that time. They were labelled on transparencies laid over the section plates. We identified all of the nuclei of the thalamus and looked at their projection systems.

We looked at the specimens of the cerebral cleft as well - cases in which there were no destructive lesions of the cortex, yet there were major malformations downstream. There were hypoplasias in the banks and floors of the sulci which make them so different from porencephalies. There was also gliosis and loss of glia and of neurones. The abnormalities were bilateral but not necessarily symmetrical. Then the question what do you think is the underlying cause of these pathologies? Well for me that still remains to be defined but it must be early developmental - very early. I wanted to define them more clearly and not just treat them casually as porencephaly. They were not commications between the sub-arachnoid space and the ventricles - in these cases there were no such communications. They could be the result of some untoward event in early embryological development. So I always insisted that it was the origin that was important. There was an accompanying ventricular

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dilatation - a hydrocephalus, often with only a thin cortical covering. When the brain is removed from the cranium this may be broken so that the ventricle collapses and you see through that thin ventricular wall the striatum, thalamus, third ventricle etc. That would be what Courville described in 1935 as hydrancephaly. It is beautifully illustrated in his atlas, but it was mistaken for destructive lesions. I would be inclined to classify them as bilaterally symmetrical developmental clefts rather than as porencephalies which by implication suggests that they are of vascular origin.

There was this Swiss fellow (his name was possibly De Mourcier) who sharply critized my work claiming that all these changes were vascular. The objection to that which I pointed out was that they are very early - some of them clearly occur before there is really an organized vasculature. There are only sinuses in the primitive wall of the brain. These were really bilaterally symmetrical sylvian clefts - an agenesis in the territory of the middle crerebral artery. But there was no evidence of agenesis of the artery - you could see the middle cerebral and all its branches.

There were however great proliferations of cell populations and the cell densities were increased and microgyria in a clear gradient. But this is not producable by regression to a less developed stage from something which is developed. That is the least plausible explanation - that that the cortex regressed to microgyria after being more normally formed. The glia were increased in numbers and density and compacted. The laminations of the cortical plate are lost. There is a gradient progression from this lesion toward more normal cortex.

(continued)

Well we talked about that a lot. The thalamus was the thing I wanted to unravel for my own arguments too, you know. Some of the structures were quite obvious. The anterior thalamic nucleus you can see quite clearly, but some of the others the centrum medianum and the subthalamic nuclei were quite difficult. Papez found to his delight some of the myelinated fibers to the striatal lemniscus. So we spent a lot of time on this sort of thing.

Papez came again the next year in 1947 to visit the laboratory and then when I moved to the Connecticut State Hospital in 1947 he came again and spent sometime with me. I arranged a room for him in the employees building. On that visit he developed a terrific migraine. I was terribly alarmed that he was so sick. I was anxious to get him to the Hartford Station, to take the train to Ithica. At that time he stayed in his room for 2 days and as soon as he felt better he wanted to get home. I think that was in 1950. The third and last time he visited me was in 1952. The first of his visits was in 1946. Then he came again in 1947 in the Spring - I think. July 1st, 1947 I moved to Connecticut to the State Hospital and Papez came in 1948 or '49. I can't recall exactly but I think it was in the Spring of '48. Then when I came to Boston in 1950 I invited Papez to come and give some lectures at the Medical School. He gave two or three lectures. Pearl came with him and stayed with Mary. He and I worked at the Medical School (Warrn Museum). I think that was 1952.
This was after he had left Ithica and moved to Columbus Ohio. He mentioned that he was upset and angry at that time since much of his personal scientific material both in his office and in his laboratory - he was not permitted to take to Ohio.

Ed: This material in his laboratory and office - letters, drawings, notes, photographs etc. was collected after his departure by Dr. Glenn Russell and stored in packing boxes until he sent it to us in 1977. It became the nucleus of the collection of Papez archives and memorabilia which we are now extending.

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In that discussion of his personal scientific material Dr. Yakovlev asked "what about his slides?" We have none of them and have no information about that material.

P.Y. - Yes, that is so sad. That is why I fought like a beast to save my slide material in Boston. As you know it was moved pretty much in toto to the A.F.I.P. - about two tons of slides.

K.E.L. - We have a number of sketches obviously made from slides but that is all. Did Papez tell you any of the details of his leaving Cornell and Ithica?

P.Y. - Well, not much but I know that he was very resentful and unhappy.

K.E.L. - Did he talk with you about the work he was doing in Ohio, particularly about the inclusion bodies, intracellular in brains of schizophrenics?

P.Y. - Yes, a little. I know he was very taken with it.

K.E.L. - Did he show you any of that material?

P.Y. - Yes, he showed it to me, but you know, I must say that I did not feel competent to appraise it critically. I had no arguments myself that it was not true.

Later I was sitting on a Study Section at N.I.H. when he applied for a grant for that work. My argument to the Section was that he should be supported. This problem has to be explored and looked at carefully. He got that first grant but then they did not renew it or something like that. One of the arguments against him was that all of the spots or bugs were mold growing in the washing solutions. That argument was used against him but that is not enough. You have to actually find out. Just because someone says he thinks it is mold in the water is not adequate. It has to be examined.

But there was always a crowd that had their eyes set on what they were going to get from these Study Sections. It was all so pre-programmed. Most of the time I was sitting there bored - a rotating chair (I think he means muscial chairs). It was pretty impossible. I was only on for one term, and I didn't like it. There were two people I fought for - one was Papez, the other was Conel - the anatomist. He was a retired Professor of Anatomy at Boston University Medical School. He retired in 1930 and Sidney Farber at the Children's Hospital took him under his wing and provided him with funds and a place to work with a secretary and a technician. He had anatomical mat erial from the hospital to study (Ed. his name was J. Leroy Conel).

K.E.L. - Did you ever know a physician named Vanderahe who worked with or was associated with Papez?

P.Y. - Yes, I know him very well - a wonderful person.

K.E.L. - He died in 1978.

P.Y. - Oh, I didn't know that.

K.E.L. - Papez was apparently very fond of him and we have much of their personal correspondence.

P.Y. - Vonerahe was a wonderful man - a real scholar. He was primarily a clinical neurologist - a clinician who wrote papers. He wrote an important paper on diabetes.

K.E.L. - Yes, and on polyneuritis, and on an interesting case of epilepsy and rage attacks with deep temporal lobe tumor.

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P.Y. - His writings were always very intelligent. It was through him that I really got to Malone. the man who made the first detailed analysis of the thalamic nuclei. His work was done in 1910 in Berlin with Nissl preparations in Jacobsen's laboratory. I have a little monograph by Malone reporting on those studies. I had heard about it and finally located it in a second hand hickory book store. It was a book that had been in the library of Akelitis - the Neurologist who was in Rochester, New York, an associate of W. P. Van Wagenen, the Neurosurgeon.

K.E.L. - What did Vonderahe have to do with that?

P.Y. - Well, he told me about Malone who was working in Cincinnati in 1900-1910. I think in 1910 came out his first study of the thalamic neclei. It is particularly interesting because you could see how the idea of the reticular formation was already hovering about in that time. Malone said that the thalamus consists of two parts - the nucleus communis which is richly reticulated within which the discrete thalamic nuclei are all embedded. That is beautiful.

There is a break in the recording at this time. The next section of the tape is a discussion about the different designations of brain morphology: Von Economo's designations and Brodeman's areas, etc.

P.Y. - I forget how many cortical areas Brodeman had labelled - it was in the 40's or 50's - different cortical areas. Well, it can be divided further also. I forget who did it but the suggestion was 112 areas or something like that. After all each neurone in the cortex is different from all others so that in actual fact you could reach numbers in the billions.
It is interesting when you put it in the frame of reference to the sequence of development - how these cellular differences and characteristics of topography emerge during the course of development. Secretly (?) there are only regional differences or zonal differences - or fundamentally only frontal and parietal. Those are the two great pediments of the brain - the pediments for the great afferent and efferent pathways of the brain.

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K.E.L. - Yes that is very much like Pavlov's remark in discussion you quoted with one of your classmates in St. Petersburg.

P.Y. - Yes, Pavlov was asked about the frontal lobe and he said "yes - that is the anterior horn". Pavlov was a physiologist and you know he didn't give a damn about anatomy. Well, he paid some attention to it of course. He mentions someone who did studies on dogs that had their frontal lobes resected. I think they were Goltz's dogs. They behaved in general like live dogs, but they did nothing with what their sensory receptors conveyed to the brain, because their frontal lobes were not available. They were hungry but did not know how to go about getting to the food and eating it. They were simply unable to translate the privacy of their visceral experience to the sensory experience of the external world, to enable them to translate all of this into the realm of motor behavior which satisfies and preserves life. When you are hungry you translate that sensation into movement and behavior to fulfill that need. Pavlov said that the anterior horn is part of a continuum of movement that extends all the way to the frontal lobe. He also said that the sensory root neurone is part of a continuum of sensation that extends all the way to the parietal lobe - the posterior half of the brain. That is a remarkable generalization - brutal and crude but useful. There is sense to it and the sense is evident.

K.E.L.- I was thinking back to your remarks about Malone - Did he come from Germany?

P.Y. - No, he was an Ohioan from Cincinnati. He went to Germany to study with Jacobsen in Berlin - one of the great anatonomists of that period. Like Kappers in Holland and Cunningham who I think is still going strong in Dublin, I think, Cincinnati you know was deeply rooted in intellectual America. It was an early center of intellectulization of Society in America. Somehow it seems to have lost some of that position. Similarly Philadelphia. Philadelphia was very strong intellectually - even more than Boston. Boston was more I should say commercial - no not that - I am trying to find the word. Interested in the principles of social

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of social structure and mechanisms. They were Republicans from the very beginning - right from the landing of the Mayflower. Other places were a little more democratic. The Philadelphians particularly - Philadelphia played a very important role for 125 or 150 years of our history here. Bostonians were playing it from the very beginning. Then there was that split. The well-mannered offspring of somewhat degenerate aristocrats, parents from the old feudal times who were shoved off actually and given land in the New World. In Queen Anne and King George's time and William of Orange. A way to get rid of them you know. They were feudal and set themselves up in plantations like Lord Baltimore and others. And the West India Companies. "Send them abroad".

K.E.L. - It was Vanderahe who introduced you to Malone?

P.Y. - Yes, I think Vonderahe went to school in Cincinnati and studied under Malone. I met Vanderahe at the meetings of the A.N.A. (American Neurological Association) in the 30's and 40's and even a few times in the 50's. He would show up there from time to time. Then I didn't see him anymore. Charlie Aring invited me to Cincinnati and I met Malone. I was delighted to meet him. I know Vanderahe always thought of him as a fine and very superior polished mind, you know.

Is Vanderahe still living?

K.E.L. - No, he died in 1977 I think. It was his Son who sent his father's papers to us. We had written a letter to Dr. Vanderahe (A.R.), thinking he was still alive - to ask for any memorabilia he might have relating to Papez. His Son was very pleased that someone was interested in his father's work, so he sent those related to Papez directly to us. A very important exchange of personal letters between Vonderahe and Papez.

How was it that Malone put the statement about the reticular formation?

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P.Y. - Well, it wasn't so specifically stated but in the context of his description of the thalamus I referred to it in the introductory chapter I wrote for Bing and Haymaker. I brought up the point that the first apparent conception of the reticular formation was in Malone's description of the thalamus architecturally. He spoke of the reticulated cell type which is rather uniform and lies everywhere surrounding the identified nuclei and even within the nuclei as though this were some primordial type of cell. There is an atlas with those drawings of the thalamus - Malone's work. The text is not much more than 50 pages in large script. It talks about the organization and divisions of the thalamus. The whole mass of the thalamus is this nucleus comunis and within that great nucleus, the cells of which are everywhere, lie the specially differentiated nuclei populated by distinctly different cells - the magno-cellular, parvo-cellular etc. These groups of neurones are distinct and have different forms and shapes.

K.E.L. - I think Vonderahe was one of the people closest to Papez because we have never gotten anything comparable in correspondence from any other source. In some of those letters there is direct reference to the paper on Emotion. Papez writes to Vonderahe "it would be wonderful if we can establish the mechanism of emotion because in the past emotion has been treated as magic". Apparently Papez and Vonderahe talked about this subject area in a very comprehensive way. But what is so startling is that Papez made no reference we can find to the Emotion paper in any of his subsequent publications. Even more surprising, in all of your contacts and exchanges with Papez over more than a decade, that subject was apparently never mentioned. In spite of the fact that your paper in 1948 "Motility, Behavior and the Brain" and the Papez paper on Emotion are very closely related and complimentary.

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P.Y. - Yes, that is right, when I read Papez paper I had the feeling that the ventral and lateral areas of the neopallium were not really represented. And also to make the hippocampus part of the limbic apparatus did not fit my logistic notions that the hippocampus is a very primitive component of the brains of all vertebrates, while the cingulate gyrus is found only in mammals. Perhaps one feels that they should be separated because one guiding notion that I have followed is thinking of the end brain not as hemispheres but as archicortex which doesn't know right from left. They are all in the middle - the cells of origin. They are one like a baseball is one - if it is not one it is not a baseball. These components are really one. One is medial ventral, the other dorsal. The dorsal part of the hippocampus grows with the hemispheres which evaginate and are bilateral. In this bilaterality the limbic zone of evagination in this bordering zone of the hippocampus is not quite bilateral in the septal area and subcallosal gyrus. Here they are contiguous and blend so that these regions are the pediment of the entire end brain. They are the dorsal lip of the anterior neuropore. This is the future septal area - the olfactory tubercle and medial olfactory gyri or striae. They are all paleocortex. Dorsal from this area like a fountain head emerge two streams - one lateral and one dorsal. One is pulled away laterally as the hemisphere grows, pulling it down into the temporal area so that the main mass of the hippocampal archicortex lies right against and brackets the thalamus. It sticks to the thalamus. You can call it truly epithalamic. The frontal portion of the stream is epistriatal rather than epithalamic. It is nearest the striatum - that was Jackson's word. So this frontal evagination is very specifically mammalian where as the ventral hippocampus is not exclusively mammalian - nor the olfactory area as well. That dorsal border of the evagination is a zone of transitional cortex, developing fully from the archicortex only in mammals. It forms a complete ring around the Foramen of Munro. The Foramen of Munro is the center of the ring and represents the limbus of the hemisphere - what is along the dorsal part of the ring is meso-cortex - a transitional cortex. Brodeman thought that all cortex at one stage or another is six layered and that most of it remained six layered or passed through the six layered stage. That is not so. It was pointed out by Philimonov and Kholikov.

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K.E.L. - What is the background embryologically of the amygdala in mammalian and vertebrate development.

P.Y. - Well we speak of the corpus striatum and in the literature of comparative anatomy the archistriatum. That gives us a hint that it might be related in mammalian end brain development - to the insula. Philimonov has an excellent article on the development of the insulae - they are not part of the neocortex or the striatum - they are in between, in their own autonomous position - just like the caudate and putamen. The amygdala and the striatum are a continuous stream of gray matter. You can think of the striatum as the sail of a leaning ship. The amygdala is on a par with the striatum, that is the caudate and putamen. These are subcortical formations - they are not part of the cortical plate.

K.E.L. - Where do you place the orbital cortex with its connections through the insula to the anterior temporal cortex, through the uncinate fasciculus?

P.Y. - I have seen this uncinate bundle as similar to the cingulate bundle or cingulum, but lying ventrolateral rather than medial. There is a continuous intermingling anterior and posteriorly going both ways. The cells bifurcate as Cajal has shown - some go forward, some go back, and some give both forward and backward axons. That is my notion you know. There will be some corrections. Of course for 10 years I could not push it further because there was so much chaos in the moving of the library and worrying about what was to be done.

K.E.L. - How does the anterior temporal cortex fit in. It is transitional cortex. There is nothing like that in the medial limbic circuit. It is the closest to true neocortex in the limbic system, is it not?

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P.Y. - Yes, but you know this temporal pole - this area 38 - it is frontal lobe. (This was spoken almost in a whisper as though a secret). That area is architeconically and developmentally frontal lobe. If you take a plane of section through the Rolandic Sulcus and the central sulcus of the insula - you cut off just area 38. This tip is the part of the frontal lobe where the insula will develop by great hyperplasia or proplasia overlying the parietal operculum and forcing it back toward the vectoral zone of the calcaneal cortex. So there are three primary projection areas - the so called sensory-motor strip, the vectoral occipital and the temporal acoustic. These are the three primary zones. All the rest of the brain is organized around these entry zones. These gateways into the cortex and to a lesser extent from the cortex, but primarily entry into the cortex.

K.E.L. - What you are saying is that the anterior temporal cortex has been going through the same evolutionary displacement as the hippocampal formation?

P.Y. - Yes, in other words, putting it crudely what appears on the anterior temporal pole was originally frontal lobe in that region where the insula develops. As the parietal mass increases the former frontal insular is pushed downward by this most rapidly and massively expanding area of cortex, but the anterior temporal lobe and pole is already developed and in position - passively pushed forward by the massive development of cortex behind it.

K.E.L. - Do you think the temporal pole follows the same time course as the hippocampus in its development?

P.Y. - Yes, surely that is certainly one explanation of the divergence of Ammon's horn posteriorly - down and under. That simply follows as the proplasia of the retrorollandic part of the hemisphere - the parietal lobe proceeds to develop. This proplasia proceeds much faster in the latter part of fetal life. You have only to look at the lateral side of the hemisphere as the mass distribution changes it from a nearly smooth vessicle before the cortex even exists on the convexity. You see the great Sylvian cleft developing into which a great chunk of that

mass is being displaced from above and behind to downward and forward. The vectorial zone of the occipital lobe which is specifically human explains why that shift is so massive. The occipital pole in the monkey is quite blunt you know. It is sort of flat and is almost entirely area 17 of the calcarine cortex. Only small marginal rim represents areas 18 and 19. The mass of area 17 is just behind the parietal lobe. (There is a break in the recording at this point).

K.E.L. - Do you think of Warren McCullough as being a key figure in the development of cybernetics?

P.Y. - Well, I remember a series of conferences that were held informally at Vanderbilt Hall (Harvard Medical School) in the dining room at a table beneath the stairs. I remember participating in two or three of them. Stanley Cobb was there, it was 1937. At that time there still was table service with waitresses. That ended of course during the war. In those little conferences "round tables" were David Rioch, Norbert Wiener, and Dempsey. I don't recall Morrison or Lanman at those I attended, but Alex Forbes, Wislocki, and Rosenbluth were there. No Rosenbluth was already in Mexico then. One could sit around and listen to all these wise men discussing things - once a week or something like that. It was an open meeting in which friends exercised their tongues and minds. During that time in 1937 I don't recall hearing anything about cybernetics. It was later in the 40's when that subject began to pop up.

K.E.L. - Some people have implied that it was the stimulus of the war and military experience that made it become earth shaking. The development of automatic guidance for guns that were firing from ships as a moving platform against a moving target - all dependent on elaborate timing and feedback.

P.Y. - Yes it was largely after the war that cybernetics grew up. There were conferences with Alex Forbes and then Magoun and Moruzzi - they were at some of the conferences. Those were conferences Alex Forbes held in Walter Cannon's old Department. What was the name of the physiologist from Pennsylvania who succeeded Cannon? It was not Donald Lindsley he

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is in Los Angeles. It was not Baird Hastings - he was in Biochemistry. Well never mind it was in his department. There were some very remarkable people who came there - Hess was there and Lorenz. At that time it was a little difficult for them in the late 30's prior to the war. They were a little angry - they thought that other people were not discriminating and that upset them. Lorenz came to give the Burnham lectures - the Burnham lectures on ethology. He outlined some of the 18th century notions which were the first rootlets of the science of animal behavior in terms of the biological relationships of living organisms and relationships of organisms to other organisms and to the environment. A fundamental thing you know. Claude Bernard made it impressive and Bichat before him. Lorenz was talking about all of this behavior which tells us about what is going on - mimicry in particular. The exchange of formal movements in sequence. He was telling us how these were really universal traits and how one can judge a personality. We do judge personality through little tricks of expression and movement - how we walk, our postures and how we respond to things around us. When he was talking about this he drew on the board with chalk a picture of the snout of a camel - the camel was about to spit. And then right after that he projected the picture of a grand Victorian lady. There were quite a few Victorians in that audience. I could hardly keep myself from bursing out in laughter. Great chuckles, but he knew what he was doing and he had a point, with the Victorian lady and the spitting camel.

K.E.L. - All that work that Cannon was doing was really cybernetics - he was talking about visceral regulation - feedback and modulation. Cannon in fact extended that model to the environment as well as to social interaction in a variety of ways.

P.Y. - Well, so did Bichat in 1832. His first edition of"Recherche Physiologique sur la vie" - Physiologic research on life in the world and environment. He was then 32 years old and was Chef de Clinique of the Hotel Dieu, the hospital that was built over the Siene. There they did not have to bother with toilets. The whole problem of sanitation was rather primitive then.

The opening statement on the first page was "Life is the sum total of the forces that resist death" - the word ensemble comes after focus - the sum

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total. Well cybernetics is all there in regulation, modulation and monitoring mechanisms. Claude Bernard gives the credit to Bichat in Bernard's La Medicine Experimentale - Life is the Sum of Forces That Resist Death - it is all there.
Bichat's book came out in 1801 - I have a copy of the first edition in my library. Unfortunately he died at age 32 after an accident at the hospital. He had a bad fall and head injury. They said he had "la fever cerebrale" but it was probably an extradural hematoma.

K.E.L. - Who coined the word cybernetics? Was it Wiener?

P.Y. - I wouldn't be surprised. Yes it might well have been Wiener. It has to do with the Greek word Cyberne - regulator - governor - controller. You know in the engineering of steam engines they have this little rotating device at the top of the engine. You see it in other places too, quite commonly. It consists of two heavy balls hinged to a rotating pivot. As they rotate they spin in a larger and larger orbit until they are horizontal to the radius of the pivoting rod. The little rotating balls feed back regulation of speed, and feed back the balance state to keep the system from shaking and coordinated, etc. The rotating arms are used to keep the wheels in synchrony - regulating the range of variation and correcting for deviations. That is where the word Governor - "Cybernetics" comes from.
Claude Bernard was the Cannon of his time or rather the other way round - Cannon was the Bernard of our time. There is a point in time when these things are recognized you know. The time we live in limits the ego to recognize something important has occurred. It is absorbed, depersonalized and used, forgetting where it came from, how it got there - who put it first to human usage etc., who planted the seeds of understanding of things that have become very useful and depersonalized. In those days man's operational world was much smaller. Why did not Cannon's work have more influence on medicine? To a large extent he is forgotten or neglected.

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K.E.L. - It is perhaps because of the way we did our experiments on nervous system function. To a large extent we did it by immobilization and fixation. Here the reflexes appear to be static. It gave us no impression how that reflex mechanism would operate in an open field situation. Cannon did his studies on intact and awake animals.

P.Y. - Pavlov's statement was "I can't learn anything from a sick dog". The animal must be intact and happy - it must be able to defend itself to wag its tail and do things natural to dogs. Too often the animal is sick from the manipulations of the experiment - with the chest open or under anesthetic or with frontal lobes resected. The animal may recover but was crippled and must be regarded as crippled. This may all have been necessary for the experiment but it wasn't the picture of a real dog.

Paul Yakovlev

K.E.L. - Did you have a tendency to avoid reference to your 1948 article - "Motility, Behavior and the Brain"? It seems to me that you refer to that article not infrequently.

P.Y. - Yes, I do refer to that. I have four papers relating to that subject area. This is the last one - the paper given at the 1969 Symposium held in Toronto, "Limbic Mechanisms and Autonomic Control".

> Ed: This paper given in 1969 was published in 1972 in the Monograph edited by Charles Hockman, Charles Thomas, Publ. I had a major role in setting up that Symposium held in Massey College, University of Toronto, in March 1969.

Before that was a paper in 1971 - in Spiegels Volume, put out by Karger, titled "The Structural and Functional Integrity of the Brain". Just about that time I saw this expression of "the trinity" of the brain used by MacLean, but in a different context.

K.E.L. - Yes, that was MacLean's "Triune Brain".

P.Y. - My paper was in Karger's Journal of Neurological Sciences in 1971. Who is the person in Philadelphia? - yes, Wycis. He arranged this for Spiegel's anniversary, I think.

In 1968 I wrote a paper which essentially summarizes the same thing in a different context, titled: "The Diencephalon: Impar, Semi-par, and Toto-par". This repeats essentially the motif of the fundamental unity of the primordial zones of Hiss. The three patterns of neuronal assemblies - the three systems of conduction in the brain wall - the innermost or median, the ablateral, or intermediate, and the outer mantle layer. Each with its

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series of connectivities - the superficial marginal or cortical zone with its connectivities in parallel arranged so that the cortex controls from any point the whole string of connections giving access to the whole system. That is the idea I was working on hoping to break through further, but it just didn't come off. I left it all for someone else.

K.E.L. - It is a unifying concept.

P.Y. - It provides the shelves on which one can put in orderly fashion some of the groceries of intellectual work and other information - where is the mustard, where is the salt, the flour or whatever - ? laughter.

(Ed: Paul is now talking about his experience in Medical School in St. Petersburg - referring to the disturbances of February 27th, 1917).

These disturbances or skirmishes were going on for several weeks before that - workers demonstrating in the factory areas. There were already lines for bread in February, 1917. That was the third year of Medical School.

There was a large building where Chemistry, Pharmacology, Bacteriology and such Departments had their laboratories, next to the General Hospital of the St. Petersburg region. It was a long building facing the river or rather a small branch of the Nieva. It looked out on the Peter and Paul Fortress - I can't think of the English translation, protecting St. Petersburg, built around 1709.

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That was the Military Medical Academy - the Institutes of Chemistry, Pharmacology, Organic Chemistry where we had our courses. I was then in the Institute of Pathology. The corner of the building was on a street that continued into a bridge across the Nieva. It was a rather long and elaborate bridge. There were horse drawn trolley lines and horse drawn cabs. There was lots of military traffic, lots of vehicles.

The group I was with in the laboratory about two o'clock in the afternoon just went out to see what was going on. There had apparently been some events earlier in the day. I don't remember what made us go out, but that was when the real stuff began, after weeks of turmoil and local protest. The police were of course alerted and mobilized all over the city. The population was restless and the bread lines were increasing.

K.E.L. - At that time Russia was still actively engaged in the war?

P.Y. - Oh, yes the Emperor took on himself the supreme command, though actually the chiefs of staff were conducting the war. I think the Senior General was Alexei, under Czar Nicholas the Second. The headquarters of the Supreme Command was somewhere in the Northwestern part of Russia in what was Beilo Russia, a place called Sentiloff Mergiloff - some 350 miles West of Petrograd.

I remember how we rushed out to see what was going on. At the head of the bridge on the right bank where the Institute was - we saw an armoured car - an attack vehicle with a dome. I was impressed with the seriousness of what was happening. There were no longer simply rumors and unrest. It had been building up since the end of 1916 when Rasputin was killed and drowned.

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Anyway on top of the dome of the armoured car there was a man in a leather jacket waving his arms and orating and announcing to the crowds "the regiments have joined the people" or something like that. There was a Kerensky Government made up of some sort of assembly of people's committies. It was a sort of Parliament, but as I recall the Duma - the old Czarist Parliament was still operating. It had been set up after the Revolution in 1905. This was the third Duma which had been in office about 10 years. The second Duma did not last long. Within the next few days we were told that there was a new government in office. The previous government had a large cabinet and a Prime Minister who was Prince Voff (?) whom I met later in Paris. The cabinet consisted largely of eminent lawyers, manufacturers, and landowners. The leader of the National Democratic Party was Radzenko, I think. He was Speaker of the Duma.

This was February 27th the day of the February Revolution. For me it was marked by the man on the turret of the armoured car, orating to the crowd.

K.E.L. - Your school continued through this period?

P.Y. - Yes, it continued through the October Revolution that established the present regime and continued through 1918 as well and into 1919, when our class was graduated (December, 1919).

These events reached their climax in October when the new regime came into power. On October 17th the terror began, reminiscent of events of the French Revolution. There were assassinations and violence. That was the radical turnover of the week of October 17th to 25th.

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K.E.L. - That was the "10 days that shook the world".

P.Y. - Yes - "the 10 days that shook the world". It is amazing that the medical school was able to continue through that period.

All that year we were following lectures at the Institute of Physiology on the other side of the campus. The Pavlov Institute was there. It was a three story building with a basement where the animals were kept. Pavlov lectured only part of the year. The Associate Professor Orbeilli took over lecturing giving most of the lectures, on the circulation, on metabolism, the digestive system etc.

K.E.L. - Do you remember Pavlov's lectures?

P.Y. - Yes, he was a very enthusiastic lecturer - very straight forward and blunt. Nothing decorative or equivocal about him. The Medical School was rather liberally run under the direction of the Society of Professors who were quite liberal. We were semi-uniformed. If you showed up in civilian clothes no one would be particularly surprised.

K.E.L. - Did the Professors wear military clothing?

P.Y. Up to 1914 Bechterew was President of the Military Academy. When he retired militarization was enhanced. Maybe it was 1913 before the beginning of the war. The Academy was placed under more military discipline in part to eradicate or reduce this spirit of free thinking. The Acadmey had always been in the Department of War and the Director was generally an Admiral or General. With the increased militarization the uniforms were changed. We had militarized epaulets. There was insistance that the jackets be buttoned and epaulets worn - and also arms. That is we were supposed to wear the sword. That provoked recurrent protestations from the students. Of course some of them were proud in fact to wear the sword before the girls - they were not ordinary boys - they were men with swords. They were the conservatives mostly, the ones on the right.

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The Professors were all Major General. Professor Makinoff was one of those who displayed the red lining of his military coat. This was part of the insignia of the Major General, but he did not have to wear the red lining and the epaulets. Well in fact Makinoff was an excellent horseman and a great cavalryman.

When Pavlov came in a long jacket in the end of the 19th Century style it was double breasted and extended down to the knees. You see them in the illustrations of Dickens Novels. He would come in with his coat open wearing a plastic collar. It was semi-military with gold buttons and epaulets, but he would wear it open. However after the Revolution of February 1917 it wasn't safe to show up in the streets in a Major General's uniform and epaulets. But Pavlov would then come in with the red lining and with his jacket buttoned up. He was protesting - even though it might lead to trouble - they would be provoked in the streets or even beaten. Pavlov was not a conservative but he disregarded all this commotion and regulation which he considered inconsequential. It had nothing to do with science and he was not interested.

K.E.L. - After the February Revolution did Pavlov continue to wear the parts of the uniform?

P.Y. - Yes, including the pants with the stripe on the side. He wore them on the street. In the winter he wore a fur coat with the pellerine - the fur cape or shoulder cloak with epaulets. He was not really interested in how he was dressed. It was sometime in the early spring of 1917 - it might have been in March, when he fell on the street right in front of the Institute and broke his hip. There were large heavy doors of glass there at the entrance. So Pavlov was in the hospital and Orbielli continued the lectues until the end of the semester. The hospital was the Orthopedic Institute right across the street. The Professor of Orthopedics was Hendrick Uvokovich Turner of Scottish descent. They treated trauma fractures and discloations in particular.

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Turner was very devoted to his work and very renowned. He taught field surgery you know - how to stop bleeding - how to apply tourniquets, how to splint, how to amputate and so forth.

K.E.L. - Did they name the Institute still after Wylie the founder of the school?

P.Y. - No. That one was called the Turner Institute, but for the school as a whole they referred to the Wylie Clinics. One was a famous Ophthalmological Clinic. People were sent from all over the Empire and there were others in Gynecology and Obstetrics and other specialties you know. They continued to call them the Wylie Clinics.

The school was formally called the Military Academy of Emperor Paul the First. He was the great great grandfather of Nicholas the Second. Alexander the Second was the grandfather, Nicholas the First was the great grandfather and Paul was the great great. Paul founded the Academy. It was organized by James Wylie the Scotsman, and the clinical institutes were known as the Wylie Clinics. This resulted from Wylie's dramatic saving of the life of one of the senior advisors of Emperor Paul I before he became Emperor - Prince Paul. This man had a retropharyngeal abscess which was obstructing his airway and would have killed him. None of the other physician-surgeons in the Court or Military had been able to help him. Wylie had the victim lie in a head down position over a great basin. He stuck his finger in the man's throat and burst the abscess. There was a great gush of pus and within a few minutes the man could breathe again and proceeded to recover fully. As a result Wylie was honored by the founding of the Military Medical Academy which became the prestigious school for medical education in Russia.

Anyway Pavlov did not show up for classes until the next semester. His injury was in the Spring of '17 and the next semester began in September. The fracture had healed, and he was back teaching by then - that was our third year. The school was five years with the last year the equivalent of your interneship. That year we graduated it was 4½ because of the pressures of the period. Doctors were needed and we were graduated in December, 1919.

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(Ed: In another section Dr. Yakovlev tells about his escape from Leningrad, crossing the frozen Gulf of Finland. He refers to this briefly and then continues).

P.Y. - As soon as I cleared quarantine after arriving in Finland I went to Helsinki. There was a large accumulations of Russians there. They were of two sorts - first those who escaped from Leningrad entering Finland from the East. They crossed the border by selling jewels, bribery etc. Sometimes provocateurs would catch them and take their goods and turn them over to the authorities. We didn't do that, we just walked out. There was no political motivation involved. The foremost concern was that with chaos in the country all my plans for the future were ruined. I was then just 25 years old and all my future lay ahead of me, you know. I had been selected one of four in my class to receive a grant for studies abroad - the Wylie Travel Stipend. This was the dream of all the students before the revolution. It allowed you three years of travel and study in Europe or wherever you wanted to go. The only condition was that the recipient had to spend 6 months in Aberdeen because Wylie was a graduate of Aberdeen. So after 3 years of study in Germany or France including 6 months in Aberdeen one would return to Russia on the track of a career in scientific medicine - a Professor in one of the Provincial Universities or an Associate Professor in the Academy.

But all this was broken up by the Revolution, so I decided to do it on my own. I was supremely confident and determined. If it turned out that I couldn't do it I wouldn't want to live, so I did it.

It was my original thought that after the dust settled I would return. Really I went as a traveller not as a fugitive, but to begin I had to get across this barrier (laughter). They wouldn't let me just go out. In fact they would shoot me, because as a graduate physician I should be on the front line. It was all confusion.

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I had never heard of Karl Marx and the manifesto. In fact we knew of Lenin only when he came to Leningrad, or actually it was to St. Petersburg then. I think it was in April 1917. I was driving in a ford with a military driver from the Vaccine Center. They made the Vaccines at the Institute of Experimental Medicine - the bacteriology Department. We were driving across the long Trinity Bridge, crossing the Nieva River near the center of Leningrad to one of the old Palaces which served as a Vaccine Center, where vaccines were stored and then shipped to all parts of Russia. On the left bank of the river there was a beautiful palace just next o the bridge head - an old marble Colonnaded palace two or three stories high with a long balcony along the face of the building. There was an elaborate wrought-iron decorated railing. Anyway, there was a man running back and forth waving his arms shouting to the crowd which was waving red flags. I asked the driver - "who is that?" - He said "that is Lenin". He had just arrived in Leningrad perhaps a week earlier (then Petrograd). I remember him walking back and forth the whole length of the building. He would turn, pass his hand over his brow and go back gesticulating and stopping for a moment, then back again and repeating. We were watching from the high section of the center of the bridge and had a very good view. That is the only time I know I saw Lenin.

K.E.L. - Had Russia dropped out of the war then?

P.Y. - No, the Brest-Litovsk Treaty was not arranged until November, 1918. That was done by the Soviets not by the Imperial Government. The then Chairman of the Soviet Committee met the Germans at Brest-Litovsk. The war was still going on there. Everybody was fighting. That was not long after the October Revolution - everything was collapsing. Soldiers were coming back from the front and joining the Revolution. That started in the Kerensky regime. They deserted and formed bands and became involved in the revolution.

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K.E.L. - How did you get to Paris?

P.Y. - Well at that time the Soviet Government was not yet recognized and Russia was at war with Finland under Mannerheim, so the consular services of the old Czarist regime was still operating in Helsinki and in Denmark and Poland. In Germany however, there was already a Soviet Mission in Berlin in 1919. I don't remember who was the first Ambassador there. I think Germany was the only Country that recognized the Soviets at that time and established diplomatic relations. Germany was defeated. The unconditional surrender at Versailles was signed in November, 1918, but even in January and February of 1920 there was still an Emigree Committee in Helsinki, and the consulate of the Czarist regime.

The Emigree provided a certificate that so-and-so is known to the Committee as a bonafide Russian citizen - "Paul I. Yakovlev emigrated from Russia on December 30th, 1919 and holds a valid diploma of graduation from the Military Medical Academy of St. Petersburg". That was the only "official" document I had. I had a clandestine letter from my Professor of Neurology addressed to Professor Oppenheim in Berlin, attesting to my interest in neurology and asking for assistance for this young student. If I got caught at the border it would be important to destroy such a letter since it would have made trouble for my Professor in Petrograd. That letter together with my application for visa to Germany went to Berlin. Within about two weeks I received a reply. The application was turned down because Oppenheim had died two years earlier in 1917. Of course there had been no real communication between Russia and Germany during that period as they were at war. Nobody on the faculty in St. Petersburg had any realization that Oppenheim was no longer living.

But then I sent a similar letter to Paris, written by the head of the Emigree Committee, who was well acquainted with our family. The letter I believe was to Professor Pierre Marie - and in due course I received a reply and invitation to come to Paris. I arrived in Paris on May 5th, 1920 and left five years later in March, 1925 to come to the United States.

Paul Yakolev

K.E.L. - I think we missed what you had to say about getting out of Finland, leaving Helsinki. You had been cleared by the Emigre Committee.

P.Y. - Yes, I had been cleared by the Committee and given a Certificate. The man who was Chairman of the Committee was a friend of our family. He was a tall red-headed whose name I think was Firouz. He taught in the High School in St. Petersburg.

Anyway the application to Germany was refused - the visa was not made available. The reason was that Oppenheim with whom I was to work, had been dead for two years. He had died in 1917. My application was made in January, 1920. The news did not reach the Academy in Leningrad or to any of us (it was Petrograd at that time actually). During that period we had no real communication with Germany. There was no news that this illustrious Professor Oppenheim had died. So I went again to Firouz at the Consulate in Helsinki - the Emigre Committee. Through them I obtained a visa to France through the French Consulate with transit through England. It was then about the end of March.

I took a small boat from Helsinki to Copenhagen to Hull. At that time I think I had the equivalent of about 90 pounds in total funds. At any rate I know I arrived in London with something like 15 pounds, but that was an interesting voyage you know. At that time I didn't think much about it. It was another adventure. Some 8 or 10 years later what I learned on that voyage proved to be very interesting. I will tell you about it later.

Anyway I got on the boat and disposed myself in the lower berth of a two person cabin in the second class. Since I was there first I put my things in the lower berth and went out on deck to watch the embarkation activities and see what is going on on the wharf and on deck. When I got back to the cabin, I found all of my things had been moved into the upper berth, and someone else's things were on the lower bunk. This was strange.

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I really did not want to sleep in the upper berth since it is not as comfortable, but I was not in condition to argue very much. Anyway just then a huge man entered the the cabin dressed in a Navy Uniform. He was huge, quite corpulent and clearly of Mediteranian complexion. He was the military attache of the Italian Government. This was before Mussolini who came into power in 1922. (Ed. I am sure this man was an important figure in the Mussolini era).

This Italian officer was returning home to Italy - to his wife and then proceeded to tell me in his very expansive way "you know I have a wife here too". He began that way - a wife in every port story. I was not particularly interested in him, but it was sort of instructive for me to see this Naval Attache drom the Western World who doesn't know what to do with himself.

Then the boat started and set out along the islands along the Finnish Coast the Scheres (?) - the "thousand islands" that lie between the Gulf of Finland and the open Baltic. We came out in the Baltic some seven hours later perhaps. As we reached the more open sea I began to get seasick from the pitching of the boat. I thought I had better lie down for awhile, but my Italian friend said "no, you must have a beer" - with that he turned and pulled out of a bag a bottle of beer which he opened. That simply turned me inside out you know. The nausea was awful. I couldn't stand the smell of that beer. I got down and rushed out on deck. I was sick like a dog. I was puking everything inside me. I began searching for someway to stop that - to study my vestibular disturbance, and found that if I kept my vestibular canals in the long axis of the boat I was a little better. In fact I was much better. It may have been auto suggestion but the heaving of the boat continued for several hours and I could stand it. After an hour or so I was much more comfortable so I returned to the cabin and climbed up over the Italian Officer in the lower bunk and layed down. The Italian whose name I learned only 10 years later was talking of his glories and powers. It was the pre-Mussolini spirit.

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Finally we reached Copenhagen, and my friend went out into the City. I had to stay on the boat since I had no visa for Denmark - I was simply in transit to Hull. The next morning we started across the North Sea to England. It was about 11 o'clock at night when we docked at Hull. When I came out on deck the Italian said "well we must go and have some oysters", so we walked to a saloon and he ordered oysters. I just asked for something simple for my stomach - like porridge. Very soon we were surrounded by a group of strange women - they were all painted and dressed up. My friend had a great time, but I didn't know how to deal with them. The girl next to me was the one who seemed to have the least chance to be busy with the Italian. She was rather older. I just tried to be a polite boy - but she got mad at me. She expected money and an invitation and didn't know what to do with me. I was really very naieve - 25 years old. I should have just said "no, not tonight". She thought I was spurning her. It was very awkward and a little bit frightening because I couldn't speak to her at all in English. She probably told me in English exactly what she thought of me - and it was certainly not very flattering. My Italian friend disappeared and I finished my dinner - whatever it was. It wasn't oysters but I think I had a beer. Then I went to the railroad station because the London train left very early in the morning.

I remember I was very much impressed by the dainty little British railway cars. I think I was on the train for 6 hours. The train arrived at Charring Cross and by hand sign language to the cabbie he took me to Kensington Road I think, to a family hotel. It was a rooming house really - a bed and breakfast. The cabbie somehow decided I was from Russia and it turned out that at this little hotel there were a large number of Russians - Emigres so I stayed there for awhile.

I had less than 15 pounds now coming from Hull, but somehow that didn't bother me. I went out to see if I could establish contact with the Russian Czarist Consulate which was still maintained in London, and in France as well for sometime after that - until 1922 or 23. Anyway I walked the City of London - Trafalgar Square, Hyde Park, and all the places I had read about in Dickens. They seemed fascinating and familiar to me from my reading of Dickens. On one of the streets was a black marble sign saying - "The

British - Russian Brotherwood". Well in Russia there were always many English Engineers, Teachers and so forth so I thought I would see what this brotherhood is. There was a doorman in a long coat with brass buttons. By signs and a little French I indicated to him that I would like to see someone in the British-Russian Brotherhood. He pointed to a chair which I was to occupy. He left for a moment and returned accompanied by a man who turned out to be a close friend of the man whose portrait in oil you have seen in my bedroom. His name was Daniel which he used as a Patronym. His last name was Gardner. He was a Professor at the Imperial Institute of Technology in Lennigrad - an Engineer in Machinery - something like that. He was a very close friend of my Uncle whose picture is in the bedroom. He recognized me and invited me into his office. He offered me the opportunity to give some talks for the Brotherhood Society. The Brotherhood spoke Russian. They were English. They had meetings to talk about things that were going on that interested them. They wanted to know about conditions in St. Petersburg (now Lennigrad) - questions about the food supplies, illnesses, population and things medical in particular. So that gave me an opportunity to earn some money. They gave me what I thought was a very nice sum - I don't remember exactly but about 75 pounds. I stayed in London from April 4th to May 4th. I think I still have a manuscript from those talks. I started with a very learned discussion - telling them about food supplies and nutrition. Before I left London I received another 100 pounds for those talks. I don't remember how much I paid in that pension. I was a pension de famille which I really enjoyed. My only regret during that month was that I didn't see any fog. From my reading I had always thought London was always shrouded in heavy fog, but there wasn't a day of it. It was a beautiful April. The parks and the greenery were unsurpassable.

The day I left London, May 4th was the first day of air flights London to Paris to London in one day. I don't know how many passengers they could take - perhaps 10 at the most. But it was too expensive for me. We crossed the channel by boat and I came to Paris at the Gare San Lazar. It was again lovely weather in Paris and I located a room in a hotel on Montmartre. It was a hotel with the toilet rooms down the end of the corridor. I stayed there 3 or 4 days. I had a letter from my friend

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Gardner in London to Professor Charles Richet in Paris. Then I found a room in the Pantheon near the Latin Quarter on the Rue San Michel. There was breakfast and lunch but no supper. In that first month I went to the Russian Consulate, then to the Police to get my carte d'identile. Then I had some letters to some older Emigrees. I also went of course to Professor Charles Richet. He was an old man then. Before the entrance to his office there were glass cases containing all the honors he had received including the Nobel Prize in 1912. He had these black patches of pigmentation on his face from aging. He died in 1924 or 1925. At that time Langlois who was Richet's associate had become Professor. Anyway they both quizzed me and I was able to tell them in my rather poor French some things that interested them about what I had seen and what was going on before I left Russia. Anyway Richet gave me a letter to an old friend of his who had been a pupil of Charcot and in turn she gave me a letter to Pierre-Marie. She had been an interne under Pierre-Marie when he was chef-de clinique. That family name was well known in Russia. She had an older brother who was an eminent pathologist. I think they were a wealthy merchant family somewhat like the Maxinoffs. She however had emigrated to France and Paris much earlier and had stayed there.

That summer I really didn't do much until October when I went to Pierre-Marie's. Chatellaine was then his chef-de-clinique. I was mostly with Chatillaine, but mornings were always with Pierre-Marie. At that time he was interested in acromegalics. Patients were prepared for him in advance, and many were invited to come to his clinic. Pierre-Marie was about to retire, in fact he went to the South of France in 1921. Then Soncre (?) became Professor, Chatellaine continued as chef de clinique. I learned a lot from him. It was in 1923 that he published the fact that there was a consistent depigmentation of the substantia migra, in the post-encephalitic paralysis agitans. (Ed. these are the dopaminergic neurones of the substantia migra, the specific lesion of Parkinson's disease). I think I have those reprints in the library of the Armed Forces Institute.

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You know after the revolution there was a great resentment against the Russians. I felt uneasy on that account, but I met one of Babinski's assistants a man named Yakovski who was a graduate of the Military Academy in St. Petersburg. He had emigrated in 1904 or 1905 some 15 years earlier and entered Babinski's service. They were very liberal in the days before the first world war. They would accept any bonafide diploma of the Universities - Russian, German, Italian, etc., and the right to practice medicine was not restricted either. So Yarkovski introduced me to Babinski and I stayed with Babinski.

K.E.L. - How old was Babinski then?

P.Y. - He was to retire in another year, but he was continuing to run the clinic. He was at the Sal Petrier on the Boulevard des Hopitals.

K.E.L. - You were in Paris four years?

P.Y. - No - longer than that. I arrived May 4th, 1920 and left March 4th, 1925. I went to the Monson State Hospital as neuropathologist. I was spending 3 weeks at Monson in Palmer, Massachusetts and one week in Boston. There I was reading Revue Neuroligique, Annals Physiologique and Presse Medicele preparing for my State Boards in Massachusetts and Rhode Island. In Boston I was with the Neurological Unit of the Boston City Hospital with Stanley Cobb. Stanley Cobb offered me an interneship but I told him I was too old to start an interneship. I would do it on my own. Stanley Cobb had come back from London in 1923 so he had been for about two years Professor of Neurology and Chief of the Neurological Unit at the Boston City - the Harvard Unit. Tracy Putnam and Frank Fremont-Smith were with him and there were some others. It was in 1934 that he went to the Massachusetts General to be in charge of the first Psychiatric Unit at that hospital. He was the James Jackson Professor of Neurology at the M.G.H. succeeding William Taylor who was the first Jackson Professor after Jackson himself, who was the Uncle of Tracy Putnam. Tracy Putnam stayed on at the City after Stanley Cobb moved to

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the General. In 1925, 26, and 27 Stanley Cobb's service was in the basement of the hospital - ward "K" which was for alcoholics. At that time the new neurological unit was being built with Rockefeller funds on the 9th floor. Houston Merritt came in 1928. Before that I was coming every week to see patients on Cobb's service in ward "K". After that I came to the 9th floor neurological unit, which I think they opened in 1928 or 1929.

(Ed. aside: I remember the unit in the basement for the drunks - it was known as "the Tank". I worked my junior and senior years in Medical School 1937-38-39 in the Emergency Ward sewing up many of the patients on their way to ward K. I also worked with Stanley Novak in Surgical Research in my Senior year - working on the problem of eclampsia, trying to induce pregnancy in female rabbits with Goldblatt hypertension).

Houston Merritt was one of Stanley Cobb's first residents - I think he came in 1928. Another resident was Deny - I forget his first name. Lennox had suggested I look up Deny and he took me around. Lennox was at the City then. Later he had his offices on Longwood Avenue next to the Children's Hospital and the Medical School. I would come to the City for the neurological outpatient clinics in the mornings.

(there is a shift in the recording from Boston to the early years of Paul Yakovlev's childhood and education. This conversation took place at the Paul MacLean's and Dr. and Mrs. MacLean are participating in the discussion).

Paul Yakovlev said that he was born in 1894 and that his mother died in childbirth, when he was just 18 monghs old in 1896. Her baby also died at that time (a brother) and his mother died of puerperal fever. When my mother became ill she would be moved to a new bed each day - that was the treatment. We were living in the Country and deliveries were at home by local midwives. Any obstetrician would be 24 hours away coming by train. There was a station nearby.

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I was born on the Estate of my maternal grandfather. He was the Justice or Judge of that whole region. Indenture of the peasants had been introduced in 1861 by Boris Goudonov. Before that they were free to move from one place to another. The result was that the harvests were not secure, and that could produce great economic crises. The indentured servants were in fact slaves. They were attached to the land. The landlord was responsible to the Czar for the Christian treatment of these "children of the Czar". Some of the landlords were cruel and abusive. This of course was a major stimulus in Russian literature particularly in the 18th and 19th centuries. Gogol in particular satirized the relations between the landlord and peasants. Some of the major landlords had literally thousands of peasants on their estates. They were called "souls". A small estate might have only 10 souls. You see the landlords had to pay taxes based on the number of peasants or souls. That is how Gogol wrote his satires. "Souls" could be bought and transferred from one estate to another. When a death occurred the records were sometimes rather casual. Thus the story of Chekov "Dead Souls" is a story of an enterprising gentleman - or rather a city slicker who went around from estate to estate charming the elderly widowers. By promoting affectionate and filial relationships with the old man who owned the estate he could pick up the records of "souls" that had died. When they had records there would be lists of names - Nina Petrova, Irena, Natasha etc. The records should be kept in the church, but if they were not recorded precisely the slicker would get the lists and then go to another landlord and sell them to him - so many "souls". They would be offered for sale especially at harvest time for a reasonable price. Thus Chekov's title "Dead Souls". It was quite a business. Of course there was no corpus delecti.

Allison MacLean - Could one of the "Souls" go to Medical School if he had the ability?

P.Y. - Yes, but where could he get the 3 Rs. There was no education available for the peasants or Muziks. This was more or less in the same context as Europe and elsewhere at that time.

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My father and mother were first cousins. That was a matter of great concern. They had to have a special dispensation from the Church to marry. I remember my maternal grandmother telling me that my progeniture was one of the great problems in the family. She told me the family was worried about that fact of my parents being first cousins. The matter had to be referred to very high authorities of the Church Synod - actually to the Assembly of Bishops. The Chairman of course was the Emperor who was head of the Church and of everything.

A.M. - Were you the first born in that family?

P.Y. - No, I had a brother 14 years older. Between that brother and me was another child. I don't remember whether the last one was a boy or a girl. There were four altogether. My brother would now be exactly 100 years old this year. He was born in 1881. I was born in 1894.

K.E.L. - What was your education up to the age of 12 when your father died?

P.Y. - Can you imagine? - None. I must say that at 9 years of age I was taken by my Aunt and returned to my father in the country. So I was 9 when I came to my father's Estate. I did not know how to read or write, and I remember making very rapid preparations into the Gymnasium. It was a 10 year preliminary education. When I was younger I remember being unable to read but being fascinated by the pictures. But I was able to wander and play in all of the woods. We had a beautiful forest with streams and meadows. My father was a farmer. When you ask who was my personal companion - it was probably Fritz. He was the Latvian Soldier of the so called fortress battalion. He served on the line of fortifications along the Carpathian and German boder. My father was the fortress engineer assigned to that same line of fortifications. My father retired very early. He wanted to return to the country and work on his farm.

The story goes that while my father was still in the Service he returned home to find my mother dead together with the new born baby. He stayed with my mother's brothers. They had a non-Russian family name - Chambers, but they were a very ancient family in that region. There was some mixture

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of intelligensia - some perhaps rose from the peasantry. My grandfather was a regimental surgeon - no that was my great grandfather. He was in the War of 1812 or after that war - the Napoleonic War. There were survivors of this holocaust who were heroes of the entire nation. I don't know many of the details but his son was my Grandfather Vasily Yakovlev. My grandfather was put into military school. He participated in the campaign for the caucasus and in the Crimean War. He retired from active service. He had been in the artillery and taught in a military school for cadets in the Northwestern part of Russia. My maternal family had been settled in that region for many generations. So this newcomer Plato Yakovlev (Plato is the Orthodox Saints name) had inherited from his father an Estate called Yakovlevichee. I have found Yakovlevichee in the Atlas. It is in this same area near the town of Orsia. Earlier the father had been a teacher of ballistics in the military school and had been given a number of "souls" as compensation for his services. Another one of the sons also had an Estate in that region. So these two families were neighbors. My maternal great grandmother's family were Serbs. They had been given lands in the Crimea which had just been conquered by Catherine the Second. The families could claim aristocratic connection by marriage. That great grandmother's name was Serbino Nevulichi. There is still a saying - "why not like Serbias? Their eyes are blue like a frog - yet they resemble the devil". They were Bosniaks from Vosnia. Members of that family played an important role in the history of Imperial Russia in the late 18th and early 19th centuries. Pushkin refers to the family in the history of the Bogachov (?) rebellion. At one point they withstood a siege by rebels until help arrived - preserving some fortress on the steppes in the Volga region. This was the region in which they claimed their Chief as Emperor Peter the Third. He was the husband of Catherin the Second, later murdered in Palace intrigue, making Catherine Empress. She had come to Russia as a German Princess to marry Peter. This is Pushkin's history of the Bogachov (?) Rebellion. My maternal grandmother was one of that Bosniak family. Most of their estates were in upper Northwest Russia along a river that begins in the Volgai Hills. There are three rivers arising there - the Volga the Dniepper and the Dina. They start in the mountains which are called Russian Switzerland. They are not very impressive as mountains but they are very pretty. The three rivers diverge to the South, the Southeast and Southwest ending in the Black and

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Caspian Seas. This is the family region about two hundred miles southwest of Moscow and three hundred miles southeast of Leningrad. It is about four or five hundred miles from Lenigrad to Moscow so this forms a triangle. Historically there was no middle class. There was the intelligensia and the peasantry. The sons of the clergy produced most of the revolutionaries. The Russian Orthodox Clergy married and had families.

A.M. - Were the women being educated in that period?

P.Y. - Oh yes - in music, art, sewing, and the social graces, and in language. At that time if you did not speak French you were not a lady and would not be eligible.

K.E.L. - When you went with your Aunt to prepare for the Gymnasium where did you go?

P.Y. - I went to Vilna in Latvia. My Aunt had a private school for girls there. The greatest calamity of my boyhood was that when I got to class in the Gymnasium, they would ask where I lived, and I would have to tell them on such and such a street. They all knew that was the girl's school - the girl's gymnasium. So I would always come home another way and sneak in the back door, to avoid the issue of showing where I lived. I was nine years old when I went to Vilna. One of the first experiences I remember was being taken into my cousin's bedroom and told to brush my teeth. They gave me a brush and a cup of water. I didn't do it, but I somehow cracked the cup. One of my girl cousins who was several years older said, "well that is alright - boys always do things like that". So that was the scene for the next 10 years of my life in that house. My Aunt was a widow with three daughters - two of the daughters were married. One was a teacher of Botany, I think, in the Gymnasium. The other daughter was married to a military man who was Adjutant to the Governor of one of the Russian Military establishments.

In my Aunt's house I really lived in a female empire. One of the first declarations I remember was that boys always break dishes.

A.M. - Before that, up to the age of 9 you must have lived in an all male household.

(continued)

P.Y. - Well, there was a maid and a cook, I remember that the cook had one eye - that was awful - marked exophthalmos. The sister of the maid was named Carolyn. She was a nice person. She was good to me.

A.M. - Who took the place of your mother? Your mother died when you were only 18 months old.

P.Y. - Just a short time after my mother died my father took me to a farm he had rented in the East. His soldier-aide came with him. We lived in a large house with a big barn. There were cows and pigs. I remember one wonderful building that was the ice house. It was fascinating, set deep in the ground, you know. They would cut big blocks of ice from the lake in the winter and store them in that building. Covered layer by layer with straw for insulation. These were great stepwise shelves of ice. It was wonderfully cool in there in July and August. It was storage for meat and milk and foods that would otherwise spoil.

A.M. - You must have had a nurse - someone to dress you and take care of you.

P.Y. - Yes, but strangely I don't remember. I remember only playing. One of the earliest recollections I have is waking up in the morning in a strange house in a bed that is under a small window. Across from the bed there is a table with a pitcher of milk. I remember a beam of sunlight that sparkled with dust in the air shining right on the table and the pitcher. On the window-sill above me sat a cat. It all happened in a matter of two seconds. The cat leaped over my bed and landed on the table. Just at that moment a woman entered the room and the cat ran away. That is all I remember. It may have been a dram but it has stuck in my memory. Whether it represents a recollection of actual events or was just a dream or my imagination, I don't know.

K.E.L. - Was the Aunt you lived with in Vilna the same Aunt you visited just before you left Russia?

P.Y. - No - those were my paternal aunts - the sisters of my father. There were four sisters and one boy in my father's family. That Aunt lived in St. Petersburg.

(continued)

The maternal aunt in Vilna was Katherine, a remarkable woman. She was a teacher and founded the Gymnasium for girls there and served as Headmistress. There was some help from St. Petersburg. The School was founded around 1900. Vilna was a beautiful City.

A.M. - What influenced you to go into Medicine?

P.Y. - Well that is an interesting story. Originally I had always wanted to be a historian. To teach in a University perhaps in a Department of history or philosophy. I always liked to read history - medicine was really accidental.

When I first went to live in this female Empire in Vilna, one of the first outside contacts I made was with a boy who was a school mate at the Gymnasium. He and his younger brother and I formed a trio. There were social rules of course that you should ask your friend to come and visit you in your home. In the second year I was invited to his house and met that family. There were two younger girls and these four became my family. Their father was a doctor and all four of them including the two gils wanted to be doctors. So almost automatically I started to think and study in preparation for a medical career.

I finished the Gymnasium at Vilna in 1914 and applied to Moscow University to enter the Medical Faculty. I was scheduled to go to Moscow for interviews. Meanwhile some counsin who had some influence and importance arranged that I was accepted for admission to the Military Medical Academy in St. Petersburg which was very hard to get into. So just as I arrived in Moscow for my interviews at the University I received this letter telling me I was admitted to the Medical School in St. Petersburg. So i didn't have the interviews in Moscow at all. That was in June, 1914. I went on vacation then with my friends from Vilna. They had a grandmother who lived in the same region on the Dniepper River. this was in the South - Southeastern part of Russia. Their grandmother had a big Estate there with high cliffs along the river. There was a bifurcation of the river at that point, making an island, but the island was almost inaccessible because it was swampy. In the Spring when the water was high there was ano island at all. But in July and August when we were there it was swampy. I remember we had a great time. We were Indians and wore headdresses - hauling our canoes across that swamp. And

(continued)

of course the girls would want to swim, but there was no bath house. They wore night shirts for swimming. They were younger than we were - about 8 or 9 years old and we were several years older. At that time supervision was very strict. You know, the Russians are really prudish. They still are. Just recently I lived in Moscow for a month in the city. There was no freedom of expression - not at all. And as far as sex is concerned they are very prudish. It has always been so.

In the Country the women would have their baths on Friday. In the middle of the large bathhouse was a great pile of stones while on the sides there were broad shelves going up in tiers from the floor to the ceiling. A big fire was built in the space under the rocks so that by afternoon the stones would be white hot - not jus red. Next to the bath was a large well with buckets for water that would be brought in and poured on the stones to produce steam. It made the whole bathhouse very hot. The top or seventh shelf near the roof was called "7th heaven". To climb there you must be strong, and when you came down you are bright red like a crab. That is the hottest place in the bath. Then we would run out to plunge in the snowbank to cool off. It was really a hyperthermia. A little more would produce coma.

The women would have their baths there on Friday and on Saturday the men. The men would wander around without a stitch on - all ages. That was quite acceptable. But intersexual behavior was very strict and prudish. I was probably 6 or 7 before it dawned on me that girls were not born with long skirts on. I grew up in a very masculine family. My father and Fritz and myself - the three males. The females had their own section of rooms but their appearances were all very formal. It was only later that I became aware of two sorts of human kind.

P.M. - Where was your birthplace. I have tried to find it on the Atlas?

(continued)

P.Y. - Well you might find it there. When I was driving from Moscow to Warsaw in 1971 I came to an intersection of the main highway. At the crossroads was a sign saying "to Uretz" - that is where I was born.

K.E.L. - What were you doing driving across Russia in 1971?

P.Y. - Well I was driving the same car we are using now - the Saab. I bought it in Sweden - in Stockholm and drove up the Finnish Peninsula to Helskinki and crossed the Gulf to Leningrad, by boat. Then I went on to Moscow. Between Leningrad and Moscow I lost my way in the town of Kalnin. I was wandering around trying to find the main highway when I realized that two Militiamen were following me. My in-tourist permit was to go through Kalnin en route to Moscow - not to go riding around in the City. It was some 75-100 miles from Moscow. But I was really glad that someone was following me, as it was late in the day and I was lost. So I pulled off to the side of the curb and stopped - and they stopped too. They were in uniform and had obviously been watching and following me. But I was glad to see them and asked how to get to the main highway. They said follow us - we will take you there. It was only about half a mile. I got back on the highway and drove straight to Moscow. I suppose if I had not been speaking Russian it might have been complicated as they would have to go through elaborate identification and clearance. I simply showed them my papers. They were quite surprised that I had an American passport. I had all the in-tourist papers and photographs. It was no problem. From Moscow I drove to Smolensk then to Brest-Litovsk and on to Warsaw. From Warsaw I drove to Prague, then to Neurenberg, to Stuttgart, Zurich, and Laussane and back to Malmo, Sweden. I covered about 12,000 miles in not quite two months - 6 or 7 weeks. 1971 was the year that Nixon introduced the extra tax on imported automobiles. I had to pay something like $150 which I had not expected. It was not in my budget.

(Ed: the conversation shifts)

P.M. - I have found Vilna in the Atlas - the Latvian "Wilnius", but I cannot find Uretz - the town where you were born.

P.Y. - Well it is about 200 miles from Wilnius to Uretz - something like that. From Wilnius to Moscow must have been about 500 miles. The distances I knew were

in Verts - that is a problem - not exact. A vert is less than a mile but more than a kilometer. Now all the distances are in kilometers. The trip by train from Wilnius to Leningrad was overnight. You leave for example at 10.00 PM and arrive at 9.00 the following morning. It would be about the same as from here to Boston - something like that - a very nice trip.

P.M. - Can you tell us why Russia is called white and red?

P.Y. - Well there is White Russia and Red Russia and it has been that way for centuries. White Russia is that part that was changing hands between Poland and Muskovy. This goes back as far as the 15th Century. In 1772 Poland was divided between Austria and Russia. Red Russia is the pre-Carpathian region of what is now the Ukraine.

P.M. - What is the significance of the two colors? Is it their faces - the earth or what?

P.Y. - Well I must confess I am ignorant of that - but it is historical in origin and not related to physical characteristics. Red Russia historically had nothing to do with recent politics.

(Ed: the conversation shifts to questions about the mammiliary bodies and tracts in the Dolphin where the structures are not paired and symmetrical but single and midline. P.M. asked if there are any of these slides here).

P.Y. - Yes, I have some in my labatory at the A.F.I.P. You know I now have a hard time getting in there to work on my own material. For example, there is no place to park the car nearby until about 2.30 in the afternoon, and then at 3.30 they want to close the place up. It is very difficult for me because I like to work in the latter part of the day and on weekends when it is quiet and there are fewer interruptions. But, I am not working strictly for the Government so in that building I am a foreigner! It is a matter of security, but I don't know what danger there would be from an old man of 86 working there.

P.M. - I didn't know whether Morgan might have a set of these Dolphin slides.

P.Y. - Yes, he has, but I have a set of 20 matched coronal sections which will show the area you are interested in. I will get them. But you know because I am not a civil service employee I am essentially a stranger there - subject to all the restrictions of security. For them it is apparently difficult, particularly on Saturdays and Sundays - they aren't used to having anyone in the building - but an old man of 86 who has never stolen a silver spoon! You need somebody with power and authority to talk for you, to get around that sort of obstacle, but I haven't found the person yet.

P.M. - There is another question I have wanted to ask you. I can't find it in any of the tests of neurology and neuroanatomy - in the bulb the tongue receives bilateral innervation - right? When you establish dominance for speech you essentially have the speech centers in the brain stem under the control essentially of one hemisphere nobody talks about how that asymmetry is sorted out in the brain stem. I wanted to ask you about this particularly because of what you have said about the asymmetries of the pyramids - being better developed on the right. That is more of the fibers from the pyramids go to the right side of the cord. You describe the pyramids as being better developed from the dominant hemisphere.

P.Y. - Well, not exactly that, more fibers from both pyramids cross to the right half of the cord. We had a sample of 130 brains as I recall. The crossing bundles of the left pyramid, that is from the left hemipshere pyramid is larger. The crossing bundle from the right hemisphere crosses at a higher level than the left and has a relatively larger number of fibers uncrossed i.e. remaining on the right half of the cord. This results in a larger proportion of the pyramid of tract fibers lying in the right half of the cord. That applied to 80% of the brains in our sample of 130.

(Ed: There was a break in the recording in the last few sentences of this section - so this is not a direct statement by P.Y. The question of possible asymmetry of innervation controlling speech in the bulb was not resolved in that conversation.)

(continued)

(Ed: The next tape begins with a small fragment of conversation about the escape from Leningrad. P.Y. is speaking about the medical student - graduate who was his companion on the December 29th and 30th crossing of the frozen Gulf of Finland).

P.Y. - We separated after we reached Helsinki but he later turned up in Paris, much to my surprise more than a year or so later. Anyway he stayed with me two or three days - I had a room then on the left bank of the Siene. I remember having a meal in the sidewalk cafe along the river. He was then practicing homeopathics or homeopathy.

Anyway when we got to Helsinki he went to the Consular Service. I thought he was going to Siam. That was what he intended I think, but you know he was a Pole and he ended up going to Warsaw where he was mobilized in the Army under Pilsudski. You know Pilsudski was the first President of the Polish Republic. Their armistice was the Versailles Treaty in November 1918. This was 1920. Anyway he suddenly turned up in Paris in 1924 and said he was going to Brazil. Why Brazil I don't remember - I don't think it was very clear. Only a few months later at the end of 1924 in December or in January 1925 he wrote me from Dakar, Africa saying he was coming to Paris. He did not say why, but apparently things were not turning out right for him and he decided to come back. I still have his letters somewhere. We had a visit in Paris for 2 or 3 days at that time. He liked the social life. At that time he seemed quite elated - yes I think he was high. That was the last I ever saw of him. He might have perished in the war years later, but at that time he was sick.

K.E.L. - What was he planning to do in Siam before he was re-routed to Poland? That was a somewhat strange destination - don't you think?

(continued)

P.Y. - I am not sure exactly, but I remember that when we were in Medical School he was befriended by Professor Maxinov. Maxinov was a great collector of butterflies. He would go all over the world on his Sabbaticals and vacations. He had been to South America and Africa and Siam, collecting specimens. Siam must have interested him but in Paris in 1924 he was sick. I remember once when we were in Medical School in Petrograd. I went with him to the home of a Phramacist/Druggist in Petrograd. I remember being startled by the amazing display of food and drink and elegance of living - so out of preportion to what was going on outside. This was during a period of real starvation. It was a time when many of our Professors were suffering and there was great distress for people in the streets - we had ¼ pound of bread a day. To get real food we had to travel increasing distances outside the city at some risk of getting caught - perhaps a radius of 100 miles to smaller villages where there was still food. One would give something to the peasants, you know - silver or jewels which were easy to carry. We would then get bread and bring it back to the city. In fact I went once to Estonia with a horse and cart - about 75 miles west of St. Petersburg, to bring back some potatoes. I was arrested and kept for 2 days. I was placed as a prisoner in the great bedroom of a really splendiferous Estate. It was a beautiful room. this was a rather tough Commissar you know. Finally I was told I had to go to Pederhoff some 30 miles from Petrograd and had to deposit my potatoes there. They took the potatoes - there were perhaps two sacks. We had some flour too.

K.E.L.- You were arrested on the assertion you were stealing?

P.Y. - No, it was illegal because they said I was speculating. That I was going to sell the food. Besides I still had part of my uniform. No epaulets but clearly not an ordinary soldier's uniform. It was an officer's dress and clearly meant higher class or aristocracy. It was a really tough moment, but somehow I got through it. Anyway what I was referring to was my companion who was with me when I left Russia in December, 1919. In Paris in 1924 it was obvious that he was a sick man. He had a serious addiction problem - morphine or cocaine or something like that. You will recall that when we set out to cross the ice to Finland we took a bottle of Vodka with us. He had put some herbs in the Vodka that had

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turned it a little yellowish in color. It was not clear white or pinkish but a little golden yellow. It was probably cocaine or opium or something like that that he added. Taking the Vodka on that trip had given him great energy and exhiliration, but for me it made me sick and very sleepy. I could hardly drag myself through the snow. In retrospect that must have had some connection with the affluence of the Pharmacist in Petrograd during the period when everyone else was starving and probably also the connection and interest in Siam.