CLASSIFICATION CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY

# INFORMATION REPORT

[redacted]

25X1

COUNTRY Yugoslavia

DATE DISTR. 17 FEB 54

SUBJECT Scientific Education/Curriculum/Textbooks

NO OF PAGES 9

PLACE ACQUIRED

DATE ACQUIRED BY

DATE OF INFO

[redacted]

25X1

NO OF ENCLS. (LISTED BELOW)

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

[redacted]

25X1

1. In discussing universities and entrance requirements, it should be borne in mind that the administration and curriculum in Yugoslavian universities differs from US universities. The universities in Yugoslavia and their constitutions are patterned after the German system of higher education.

   a. In Yugoslavia there are no high schools. Our comparable institution might be considered as the gymnasium, but actually an eight year gymnasium reaches the US junior college level in quality and content of instruction.

   b. After a student completes the gymnasium, he takes an examination orally, which we call the Mala Matura. If a student successfully passes this Matura, he is then the recipient of a diploma from the Sredna Skola /the central or middle school/.

25X1

CLASSIFICATION CONFIDENTIAL

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STATE | x | [illegible] | x | SRD/SI | EV | DISTRIBUTION | | | | | | | | | | |
| ARMY | x | FBI | | | | | | | | | | | | | | |

25X1

c. In order to enter the university [prior to WWII], a student had to be in possession of a diploma showing that he had qualified for entrance by passing the Matura. Even before WWII the universities and secondary schools were operated under government sponsorship and were consequently free to the students. [redacted] however, that when an excessive number of applicants requested entrance to the universities, additional exams were given in order to screen a certain number and eliminate the less capable.

25X1

2. Department of Technology

a. The technical faculty which is now called the High Technical School [Visa Skola] has been separated from the rest of the university. Its scientific courses last for four years. Courses in the technical schools are divided into two groups by years. The first group and first two years of scientific education consist of 10 major subjects which are by and large theoretical. We referred to the first two years of higher education as Priprimi Ispit [Probationary Period]. In addition to the required theoretical subjects we also taught courses in drafting and such subjects as analytical chemistry, physics and minerology.

b. Upon the completion of the first two years which included examinations, laboratory work and graphics, the student was entitled to continue with the final portion of his education -- the last two years [referred to in the US as the upper division]. We called the last two years the Diplomski [for the diploma]. During the latter two years the subjects were more specialized and as a result students selected their desired specialties such as mechanical, electrical, mining, aeronautical and shipbuilding engineering or concentrating in procuring a diploma in technology.

c. The school of civil engineering is divided into three separate entities or branches. These were road building, bridge building or railroad engineering.

d. With reference to the subjects enumerated above, a number of them were required of all students no matter what their major field may be.

e. After the final two years of course work was completed plus successful examinations, laboratory experiments and graphic work, the student has to select a topic which he pursues for research purposes. This topic, which we call Diplomski Rad [diploma work] consists of completely original work. As an example, if a student's discipline is not the field of chemistry he is expected to do combination field and laboratory work (normally the student has three months to complete his project but if time will not permit completion of his experiments, he is permitted to petition for an extension which usually runs another three months. After completion of the above work, he submits his findings to his faculty for final approval. He is then called before a board of faculty members where he is expected to defend his thesis, his drawings and his conclusions. If he satisfactorily passes this exam he is the recipient of a diploma with the title of engineer in his specialty.

f. The young engineer must spend three years working in industry or in other gainful employment in his field of specialization before he can do graduate study. He may enter graduate school and take course work for an additional two and one-half years. In the event that his academic work is successfully completed, he is permitted to petition for the PhD. To obtain his PhD, he must write a dissertation in an entirely original field of scientific endeavor. If he is able to defend his thesis successfully, he receives the doctorate.

g. In addition to the above scientific departments the Yugoslavian universities have a separate faculty for agriculture and forestry. Courses for the degree in these fields are also four years in duration. In many respects the subjects are closely related to the subjects within the Technical School. In order to receive the degree, engineer of agriculture or engineer of forestry, a student undergoes the same procedure as given for the technical and scientific courses above.

3. **Srednja Tehnichka Skola** (Middle Technical School)

   a. In these schools the education, of course, was not as prodigious as at the universities. As an example, students could enter the Srednja Tehnichka Skola after only four years at the gymnasium if they could pass the Mala Matura. This organization is similar to the gymnasium, but the subjects are the same as corresponding university subjects, but are never as intense, particularly in investigating the theory aspects of science.

   b. Before WWII students who completed the Srednja Tehnichka Skola were not permitted to enter the university unless they completed the last four years of the gymnasium and the Matura. This, of course, practically eliminated such students from entrance to the major universities.

   c. After WWII this rule was abolished and such students were permitted to enter. Many such students by virtue of education and considerable work experience had perfected such techniques as drafting, cartography, etc. Many of them were more familiar with the practical aspects of various phases of engineering than were those students who entered the university directly from the gymnasium.

4. Curriculum for the first two years for science and technology majors, is as follows:

   a. Mathematics (calculus, analytical geometry) - these two courses continue for the entire two year period. They are taught four hours per week with two hours of lecture and two hours of actual exercises.

   b. Physics - required in the first year. This course is to a great extent concerned with experimental physics; is a four hour a week course plus one hour of laboratory. Fifty problems are assigned in this course that must be completed by the end of the first year.

   c. Inorganic chemistry - this course must be completed in the first year for students majoring in technology. After the first semester is completed an exam is given to determine the ability of a student to take quantitative analysis. In the second semester the student is also introduced to quantitative analysis. Inorganic chemistry is a four hour per week lecture course. The chemistry laboratories at the Schools of Science are open from one in the afternoon to seven in the evening. Students may use the lab for their experiments at their own discretion.

   d. Descriptive geometry -- this course must be completed within the first year for the student is taught graphic presentation charts, etc. During the first year of geometry the student is presented with eight sheets of assignments which he must complete in addition to attending lectures.

   e. Mechanics - the content of this course includes instruction in statics which continues to the end of the second year. Kinematics and dynamics are begun in the second semester and also continue to the end of the second year.

   f. Stress analysis - this course is taught in the second year. An emphasis is placed on problems and graphic presentation.

   g. Geology and mineralogy - two hours a week of lecture plus four hours of lab. Content is primarily concerned with sampling, evaluation and analysis.

   h. Architectural and mechanical engineers are required to take surveying their first year. Civil engineers, however, must complete two years of surveying. Surveying is taught primarily by practical application through field work, one afternoon per week.

   i. Drafting - an intense emphasis is placed upon developing drafting talent and ability. Machine parts and diagrams thereof are constantly assigned to the students.

25X1

[redacted]

j. Technology of iron - we professors called this course mechanical technology No. 1. This course concentrates in the study of production of iron and steel from the raw state to the final product.

k. The above subjects represent the most essential requirements in the curriculum of the first two years for science majors.

l. [redacted] organic chemistry is introduced during the second year. The course is devoted entirely to lectures with no laboratory assignments. 25X1

5. Curriculum - Second Two Years or Upper Division. The course in technology also includes applied chemistry, some mining and means of production and concentrates to some degree on application of theory. The theory subjects are:

a. Mechanical technology II, III and IV - these courses consist of the study of manufacturing and processing. Such raw materials as textiles and lumber are studied from the raw phase through the finished product. Instruction is given in production methods and production machine tools intensively. In order to receive credit for mechanical technology, a student is required to complete successfully a project dealing with any of the raw materials.

b. Chemical technology - such items as paper, explosives, dyes, etc. are studied strictly from the viewpoint of learning manufacturing processes. This course is divided into two parts; organic and inorganic technology. To receive a final mark in chemical technology a student has to complete an assigned project in the field. This project was coordinated with a factory or mine to the extent that a student could carry out his research and practical work at one of these industrial installations during summer vacations. Since the vacation lasted for approximately three months the student spent the entire summer working at the assigned project with industry. His expenses were paid by the industrial concern which would presumably profit from the research which he conducted. [redacted] [redacted]

c. Physical chemistry - a four hour course which was very intensive and lasted for the entire final two years. Students in physical chemistry were assigned a number of experiments which were to be carried out in the laboratory. In fact, laboratory research consumed 90% of the time alloted for this course.

25X1
25X1

d. Electro-chemistry - one year course, two to three hours per week. Considerable laboratory work assigned.

e. Internal combustion engines.

f. Steam boilers and steam engines. The student could select a project in either boilers or engines.

g. Encyclopedia of machines.

h. Machine elements - purpose of this course was to thoroughly familiarize the student with the basic parts of machines such as gears, pulleys, clutches and shifts. In order to receive final credit, the student was assigned from five to eight projects which required him to design basic machinery parts.

i. Organic chemistry - this course concentrated in four essential categories.
   (1) Organic synthesis
   (2) Characteristical synthesis on about 20 different groups
   (3) Organic microanalysis
   (4) Preparation of ultra poison gases.

j. Gas analysis - this course was devoted to the study of non-poisonous gases, to determine their characteristics. Analysis of exhaust fumes was also part of the course content.

k. Microscopy - an elemental course devoted to thoroughly familiarizing the student with the microscope through practical application.

l. Electricity - this course consisted of two parts, theory and design of electrical machinery. Laboratory work was also assigned with emphasis on electrical measurement.

m. Business administration - the purpose of this course was to familiarize the student with bookkeeping, basic administration, labor laws, texts, etc.

n. Thermodynamics.

o. Mechanical testing of materials - the entire time devoted to this subject was spent in the laboratory where metals and construction materials were inspected and tested.

p. A new requirement was introduced in the Yugoslav universities for science students - the study of a foreign language. The student could select a language on the basis of his particular needs and interests. The languages were French, German, Russian and English. The government in 1946 tried to introduce Soviet texts at the various universities but they did not meet with the approval of professors in science because they were not on the level of Yugoslav requirements. [redacted] the Soviet texts as a whole were far below the level of German texts. The University at Belgrade, however, did use one Soviet text which we considered exceptionally good. [redacted] but it dealt with stress analysis and contained a number of practical problems. It was written by (fnu) Mershkovsky.

6. Mechanical and Electrical Engineering

a. In mechanical and electrical engineering the first two years followed the curriculum as listed under paragraph 4 quite closely. However, ME students were not required to do laboratory work in chemistry or physcial chemistry. During the last two years of course work for the ME student the curriculum was essentially comprised of the following:

(1) Thermodynamics.

(2) Internal combustion - this course was far more intense for these two types of engineer than for the student of chemical technology. To complete the requirements in this field a student had to submit a completed project.

(3) Steam engines

(4) Steam turbines

(5) Steam boilers

(6) Machine tools

(7) Mechanical testing

b. Mechanical engineers were required to complete projects on electrical motors and generators as well as a factory project.

c. Electrical engineering had two sub-divisions: (1) Slaba i Jaka Struga /weak and strong current/, (2) telecommunications - this course was devoted to theoretical and practical study of radio, radar and all types of wireless. Both phases of electrical engineering necessitated considerable study in electrical measurement.

25X1

7. Civil engineering. As previously mentioned the diploma was granted in one of three separate disciplines in civil engineering. These were railroad engineering, highway construction and bridge building. In civil engineering emphasis was placed on the study of calculations, girders, foundations, buildings, bridges and roads. After the second year was completed students seeking a degree in civil engineering were required to spend a great deal of time in practical work.

25X1

8. Personal Evaluation of Graduate Students. [redacted], the Yugoslavian institutes of higher learning, particularly the science departments, have not deviated to any appreciable degree from the curriculum as listed above. [redacted] the existing government of Yugoslavia has developed a new approach to entrance requirements at the university. [redacted] [redacted] they place special emphasis upon the personal characteristics of the student to a much greater degree than did the Karageorgevich dynasty. As an example, [redacted] a young woman who received a diploma in biology from the University of Belgrade in mid-1953. Under the Yugoslav marking /grading/ system, a student is graded on the basis of numerals ranging from 1 - 10, with five or below considered failing grades. This young woman's marks were in almost every subject, 10. She was considered as a natural by the university professors in the field of biology. They advised and recommended her for admission to the medical school at the University of Belgrade. In fact they highly recommended her. [redacted] [redacted] she has been serving as an assistant at the technical school since last summer. During this period of time she has received no funds, no salary or financial assistance from either the government or the university. Furthermore, she has not been notified of a nomination to candidacy into the graduate school nor does she feel that she will receive it. Through devious means she has learned that the present administration of Yugoslavia considers her in an unfavorable light simply because her father was an officer in the pre-WWII Yugoslav Army.

25X1

25X1

25X1

25X1

25X1

25X1

9. Student Placement

a. Prior to WWII, university professors, particularly in the fields of science, enjoyed excellent relations with industry. In fact above average students were placed in industry prior to graduation. In most cases, particularly in mining, students who as undergraduates completed projects at various mines throughout Yugoslavia were offered positions while they were engaged in completing university assignments and projects at these mines. By and large, these mining students accepted positions with the mine operators, thus having a position awaiting them upon graduation. By 1948, however, the harmonious relationship between university professors and industry was no longer existent.

b. Under the post-war Tito Government, the Savesna Planska Komisija /the State Planning Commission/ became the sole determinant in placing students in the new planned industrial economy. [redacted] in a number of cases this commission has assigned students without degrees to various industrial institutions. This was particularly true up to 1950 because there was a great shortage of scientific, technical and skilled labor. Regardless of an individual's desires or his area of preference he was ordered by the State Planning Commission to accept employment where this commission deemed he was most needed. (Had the commission intelligently assigned personnel on the basis of qualifications to do the job, the country would in all probability have fared much better. [redacted]any cases in which personnel absolutely not qualified, were placed in positions which necessitated far more ability than they had to offer. The SPK was not concerned with the family unit [redacted] instances in which husband and wife, both trained in the same professions, were separated against their will and sent to assignments far removed from each other. This was especially true in the scientific fields, namely among physicians, druggists and veterinarians.)

25X1

10. Influence of the Communist Youth Organizations

a. The Communist youth organizations of the country make it most difficult to overtly evaluate the true sentiments of personnel assigned by the State Planning Commission. The real wishes of the Communist Party are

25X1

25X1

25X1

CONFIDENTIAL

[redacted]

expressed through these organizations at so-called trade meetings, but never does the individual express his real feelings. Undoubtedly, you are aware that private associations and clubs have been abolished in the country. For example, there are no sport clubs, no photography clubs or any other private social organizations. The administration, of course, has substituted for these certain principles which do permit and encourage social functions. The following might better poin[redacted] [redacted] Practically everyone in the country, including university personnel, must join a trade union. From the various trade unions choral groups, photography clubs, sports clubs, etc. are organized. The theme behind such organization is to promote collective sentiment rather than individualistic attitudes. The army and commy youth organizations are, without doubt, permitted to organize clubs and organizations which in every case foster the Communist Party line. If you are familiar with Yugoslavian sports, this little country prior to WWII always developed soccer teams which could compete on an equal basis with any such teams in Europe. No longer are such clubs permitted outside the trade unions or the Army.

25X1
25X1

b. It may have been reported that students say they do not like to give up urban life for the more isolated rural areas, but such statements would have to be made covertly. The vast majority of scientific students realizing they have no choice as to place of assignment are very discreet in not expressing their true sentiments because they fear governmental reprisal. They would, consequently, as a whole, accept such assignments without revealing their true feelings. As you know, a student in the true sense, primarily the scientist, desires to concentrate in a particular field of endeavor, or for that matter, to engage in projects which he as an individual deems to be of interest and of value. Such a person would dislike any assignment superimposed over his interests and his wishes. There is no doubt in my mind that students dislike being sent to rural area if their interests and capabilities are contravened.

c. The majority of students now entering Yugoslavian institutes of higher learning come up through the Communist youth organizations. They receive preferential treatment when compared to the students who have had no affiliation with the Communist Party organization. This situation was most prevalent in 1948 at the universities of Zagreb, Ljubljana and Belgrade. Such discrimination was obviously detrimental to the interests of the country as a whole. Scientists particularly professors, began to escape from Yugoslavia to avoid the above situation for they were interested in true scholarship and not the political philosophy of their students.

11. <u>Scientific Textbooks in Use at Yugoslavian Universities</u>

a. "Inorganic Chemistry", A F Holleman, German, translation

b. "Organic Chemistry", A F Holleman, German, translation

c. "Physical Chemistry", John Eggert and Lotar Hock, German, translation

d. "Physical Chemistry", (fnu) Nernst, German, not translated

e. "Analytical Chemistry Qualitative", Treadwell Brothers, German

f. "Analytical Chemistry Quantitative", Treadwell Brothers, German

g. "Analytic Chemistry", (fnu) Kyegovan, Original

h. "Electro Chemistry", P Tutundzic, Original

i. "Stress Analysis", J Hlitshiev, Original

j. "Stress Analysis", (fnu) Mershkovsky, Russian, Translation

k. "Chemical Technology", (fnu) Ost, German, not translated

CONFIDENTIAL

l. "High Mathematics (Calculus)", R Kashanin, Original,

m. "Mechanic I", (fnu) Arnovlyvic, Original

n. "Electrotechnic", P Milyanic, Original

o. "Experimental Physics", Dr D Milosavlyevic, Original

p. "Theoretic Physics", V Zardecki, Original

q. "Internal Combustion Engines", V Kosicki, Original

r. "Thermodynamics", Dr Boshnyakovic, Original

s. "Steam Machines", A Stevovic, Original

t. "Steam Turbines", V Pioulyski, Original

u. "Locomotives", (fnu) Farmakovski, Original

v. "Vector Analysis", (fnu) Danic, Original

Periodicals recalled [redacted]

"Glasnik Heniskog Drustva" (Chemical Journal) Monthly, very high level

25X1

The similarity of Yugoslavian schools to German schools can be illustrated by the fact that many of our university textbooks were of German origin and were written in the German language. Some of them were not translated because of the excessive cost, consequently our students were forced by necessity to use German, French and sometimes Italian - Italian primarily at Zagrab and Ljubljana. We had some original works, of course, such as (1) "Teoriska Physica", written by Prof Zardetski, (2) "Visa Matematika", written by Prof Kashanin, (3) "Odpornost Materiala", written by Prof Klitchiev, (4) "Expermentalna Physika", written by Dr Dragoljub Milosavljevic. Interdepartmental subjects were subdivided so that the head of each of these subdivisions was a professor. The interdepartmental subdivisions were referred to as Katedra.

12. Regimentation of Scientific Personnel

a. In 1948 the administration had more engineers assigned to its various departments than it needed. This was ironic since industry lacked qualified people. The best example of this situation was the Savezni Ured Za Ceni /Federal Office for Prices/. In each department of this federal bureau there were at least three engineers and in most cases four. This bureau ridiculously had more engineers than the very industries producing commodities for which the SUZC had to determine prices.

b. If an engineer, assigned the responsibility of production at a factory, forced his workers to expend some energy, the workers through manipulation had him branded as an enemy of the working class. For this the engineer was subject to discipline or imprisonment by the Communist Party. If on the other hand, he permitted the workers to loaf his factory would not produce. In that case he was branded a saboteur by the party. This vicious circle, prevalent in many of the smaller plants in 1948, was one of the chief reasons for inefficiency and insufficient production.

c. In the years from 1946 through 1948, top men in the Ministry of Forestry and Mining were aware that Yugoslavian industry was producing about 70% of what it should have produced. During these years contests, premiums, awards and so forth were dangled before the laborers by the Yugoslavian Government, but even these lures failed to stimulate the laborers. [redacted] [redacted] several instances in which outstanding engineers were tried before

[redacted]

the courts, found guilty of sabotage and sentenced to 20 years imprisonment. They were not, however, placed in confinement but were permitted to remain in the Ministry of Forestry and Mining with this sentence hanging over their heads -- the Yugoslavian Government realized that what production it would obtain in these fields was contingent upon the use of the above so-called saboteurs. The more highly qualified have been forced by the state to work, in spite of the fact that they would prefer to begin serving their sentences. They live in constant fear that if they do not produce the sentence will be enforced at any time. [redacted] [redacted] the sentence imposed upon the above men has ever been altered or that the individuals have been exonerated.

- end -

[redacted]