TABLE 1

CONVERSION OF GALACTOSE-1-PHOSPHATE INTO GLUCOSE-1-PHOSPHATE BY PHOSPHOGALACTOISOMERASE AND ITS COENZYME

Enzyme preparation in the incubation mixture (ml)*	Hexose found after acid hydrolysis†			
	0 min		30 min	
	Glucose (mg)	Galactose (mg)	Glucose (mg)	Galactose (mg)
None	0.07	2.30	0.06	2.33
0.2	.09	2.32	.22	2.17
.4	—	2.37	.34	2.03
.6	.03	2.36	.64	1.78
0.8	.08	2.36	.83	1.58
1.0	0.06	2.37	0.93	1.45

* Each flask contained 4 mg of the dipotassium salt of galactose-1-phosphate (equivalent to 2.0 mg of galactose) dissolved in 1 ml of 0.15 *M* phosphate buffer of pH 6.95. To this was added 0.4 ml of a UDPG solution prepared according to Caputto *et al.* (*4*), 0.1 ml of 0.08 *M* magnesium chloride, the quantity of the enzyme solution indicated in column one, and water to make the volume of the mixture to 3 ml. Incubation temperature was 37.5° C.

† The values for galactose include an increment of nonfermentable material derived from the UDPG.

galactose-1-phosphate require the removal of the phosphate radicals by acid hydrolysis and involve a differential fermentation of the glucose and galactose in the reaction products, all data are calculated in terms of the quantities of these two sugars found before and after incubation. The details of the preparation of the enzyme and the analytical procedures used will be reported elsewhere. The data in Table 1 demonstrate that under the experimental conditions used the rate of conversion of galactose-1-phosphate into glucose-1-phosphate is a function of the amount of the enzyme present in the reaction mixture. The mechanism of this reaction is not definitely worked out, and as yet we have not been successful in demonstrating the presence of the enzyme in animal tissues.

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An Elevated Excretion of Creatine Associated with Leukemia in Mice[1]

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In a previous report we have shown a relationship between creatine excretion and the level of circulating leucocytes (*1*). Monkeys recovering from aminopterin treatment exhibited a marked creatinuria, the peak of which corresponded approximately with the point of maximum white blood cell response. Other experiments have indicated a relationship between methyl donors and white blood cell formation (*2, 3*). The present report presents data which show that leukemic mice exhibit a marked creatinuria.

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TABLE 1

CREATINE CONTENT OF URINE AND SKELETAL MUSCLE FROM CONTROL AND LEUKEMIC MICE

	Urinary creatinine	Urinary creatine	Muscle creatine
	(mg/100 g body wt/day)	(mg/100 g body wt/day)	(mg/100 g)
Control	1.8	2.6	371
Leukemic	2.1	9.4	361

Mice of the DBA strain, line 2, were used, and leukemia was induced by blood transfer. Approximately 0.1 ml of blood from a leukemic donor was inoculated intraperitoneally into the recipient. We have consistently found that mice so treated develop characteristic blood changes 8 or 9 days following the blood transfer and die in 9–12 days. There are characteristic tissue changes at the site of inoculation. In the first experiment, 4 leukemic mice taken 10 days

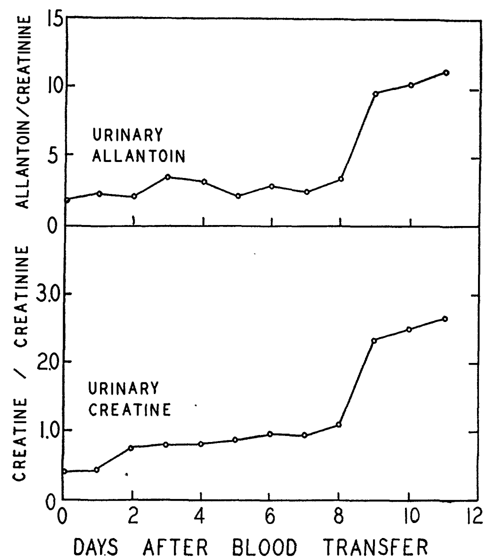

FIG. 1. Daily allantoin/creatinine and creatine/creatinine ratios of urine from leukemic mice.

after blood transfer and 4 control mice were placed in metabolism cages. A single pooled 24-hr urine sample was analyzed for creatine and creatinine (*4*). The animals were then sacrificed, and the creatine content of samples of skeletal muscle was determined. In a second experiment 10 mice were placed in metabolism cages immediately after blood transfer, and creatine and creatinine (*4*) and allantoin (*5*) were determined daily on appropriate urine aliquots. Creatine/creatinine, and allantoin/creatinine ratios were calculated, since creatinine excretion was found to be constant.

The data presented in Table 1 show that leukemic mice excrete large amounts of creatine compared to control mice of the same strain. Creatinine excretion was not significantly different between the two groups, nor was the content of muscle creatine.

Typical results obtained by daily measurement of creatine and allantoin excretion by leukemic mice are presented in Fig. 1. The average survival time after blood transfer was 10–12 days. It may be seen that, beginning about 8 days after blood transfer, there was a marked increase in creatine/creatinine and allantoin/creatinine ratios. Elevated allantoin excretion occurring during leukemia is not a new finding. The elevated creatine excretion occurring during leukemia in these mice quite probably reflects an increased synthesis of creatine, since the content of muscle creatine was not significantly different between the two groups and there was not a net weight loss. These results in conjunction with those previously cited (*1–3*) suggest that creatine may play a significant role in white blood cell formation.

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Comments and Communications

Science Education as an Ambassador of Good Will

THE exchange of educational facilities with some of our Latin-American neighbors, which has received active support through various exchange fellowship and professorship programs, has reached the point where some of the reactions of our colleagues to existing arrangements may be evaluated. The author has discussed the problem both with prominent educators, such as the presidents, deans, and professors at various South and Central American universities, and with students who were actual or potential candidates for such exchanges. Although it is not possible to present the entire picture in one brief note, a few of the reactions are worth reporting.

The vast majority of persons agreed wholeheartedly with the major premise—namely, that great benefits could accrue to Latin America through the wider dissemination of technical education and information. The questions revolve around the best means of attaining this end, and we shall review some of the pertinent considerations that were pointed out by our Latin colleagues, not all of which are fully appreciated in the northern countries.

First must be stressed the need for a broad technical education rather than a too-narrow specialization. It does no good to train a man to be an expert in the use of a particular instrument if no instruments of this type exist in his homeland; or to be an outstanding authority on a disease that occurs but rarely in his community. Yet, in the U. S. our tendency is to specialize and to reward the specialist. Thus, in graduate training particularly, a grave responsibility rests on the officer in charge, to avoid the temptation to assign one more graduate student to an intricate discipline, of which very few units exist in the entire world. The more valuable training would consist in a broad background in the subject, in the methodology of research, and in self-sufficiency and improvisation to build the necessary apparatus out of parts locally obtainable. It is always a temptation to draw ready-made equipment from the stock room, but this procedure is clearly undesirable when ready-made equipment would have to be purchased abroad at a considerable national sacrifice in foreign exchange. The success of the various European nations in making very complex apparatus and, indeed, in starting small industries is encouraging in this regard. We may cite Sweden as an example with a population of approximately 6,900,000 persons—less than that of greater New York—which has its own electronics industry, and which has constructed a large cyclotron almost entirely out of Swedish parts and materials.

The many advantages in sending students from Latin America to U. S. schools need hardly be catalogued; they can receive good training at many centers. The disadvantages to the Latin nations must also be considered. All too often the best students stay in the U. S., where they find good employment opportunities. This results in a gain to the U. S., but a larger loss percentagewise to the country that sent the students. The loss is doubly great if the country had to dip into its supply of foreign exchange to finance the fellowships. The second disadvantage has already been cited. U. S. tendencies in graduate training are commonly so specialized as to prepare a man better to be part of a complex entity here than to take the lead in the less technically advanced situation in his own country.

Exchange professorships, which are so successful among technically advanced countries, run into a serious drawback: What is there that can be offered in exchange? Seldom will a Latin country have a good technically trained professor to offer, but we might urge that professors of Spanish be occasionally sent, for this language is often taught in the U. S. by persons with atrocious accents and with no knowledge