Table 1. Blood pressure lowering activity of dimethylkynurenamine hydrochloride.

Doses (μg/kg)	Lowering of blood pressure (mm-Hg)	Approx. duration (min)
100	15	0.8 ∽ 1
200	28	1 ∽ 1.5
500	30	1.5 ∽ 2
1000	35	3.5 ∽ 4
3330	52	6 ∽ 7

Although the action lowering the blood pressure of this amine hydrochloride was a little weaker than that of adenosine, a notable blood pressure-lowering substance, its inhibiting action on the epinephrine hypertension was somewhat stronger than that of the latter.

In our laboratory, we are now synthesizing 5-hydroxykynurenamine, which is supposed to have more remarkable action than kynurenamine and probably to be an antagonist of serotonin.

We wish to express our thanks to the Takeda Research Laboratory for making elementary analysis, and to A. Tashima, Pharmacological Department of Kumamoto University Medical School for helping with our pharmacological experiment. This work was aided by a grant from the Ministry of Education of Japan.

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Natural Parthenogenesis in Turkey Eggs

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Research at the Agricultural Research Center, Beltsville, during the past three breeding seasons has shown that some eggs laid by nonmated and virgin Beltsville Small White turkeys may undergo a certain degree of embryonic development upon being incubated. This observation was first made during 1952 when it was found that 16.7 percent of 934 eggs laid by 29 nonmated turkeys showed some cellular proliferation when broken and examined after 7 days of incubation (*1*). These eggs were laid 42 to 224 days after the 29 females had been confined to a pen without males.

In 1953, 23 virgin Beltsville Small White turkey hens were placed on test. These hens had been segregated from their immature male pen mates at an early age, some at 4 wk and others at 12 wk. The first eggs were laid during January 1953, approximately 7 and 9 mo, respectively, after segregation from the immature males. During the ensuing 5-mo period, 1463 eggs were laid by the 23 virgin turkeys. In 14.1 percent of these, a delayed and abnormal type of development was found when the eggs were broken and examined after 7 to 9 days of incubation (*2*). In every instance development was not visible before a candling lamp until the fourth day of incubation. In contrast, normal embryos can be detected after 18 to 24 hr of incubation. A parthenogenetic embryo, when encountered at 9 days of incubation, had therefore attained the approximate size of a normal 5-day embryo.

During 1954, 79 virgin Beltsville White turkey hens were placed on test. These females were segregated from their immature male pen mates before 6 wk of age. At maturity they were placed in three pens, and all were given the same all-mash diet. Artificial lights were used in addition to normal daylight, the lights being turned on at 6 A.M. and off at 8 P.M. each day. The first eggs were laid during January 1954, approximately 8 mo after the birds had been isolated as young poults from their immature pen mates.

During the 8-wk period covered in this report (6 March–10 May 1954), the senior author was solely responsible for the care of the birds as well as for the gathering and incubation of the eggs. Since mated flocks of turkeys were being maintained in the same general area, special measures were taken to insure against mistaken identity of the eggs.

The procedure followed throughout the course of these studies was as follows. Each evening, all eggs laid by the virgin turkeys were placed in the incubator at a temperature of 99.5°F and at a relative humidity of 57 percent. Since earlier studies had shown that parthenogenetic development was not initiated before about 4 days of incubation (*1*), the eggs were candled for the first time on the ninth day. The eggs that on candling showed evidence of development were replaced in the incubator for an additional period of incubation. All eggs in which no development was visible on candling were removed and broken, and the disk of each was examined macroscopically for evidence of development. During the 8-wk period, 2537 eggs were laid by the 79 hens on test. Of this number, 568, or 22.4 percent, showed parthenogenetic development. In 492 of these 568 eggs, the development consisted solely of growth of the extraembryonic membranes. Even in the absence of an embryo, however, it was not unusual to find eggs in which a sheet of embryonic cells had covered almost the entire surface of the yolk. In 49 of the 568 eggs, differentiation proceeded to the extent that blood islands or blood vessels were clearly visible by candling or on macroscopic examination. In the remaining 27 of the 568 eggs, embryos as well as blood were identifiable on gross examination. These embryos attained various stages of development and are listed here in terms of equivalent development of the normal turkey embryo:

2 to 3 days : 8 embryos
4 to 6 days : 11 embryos
9 to 10 days : 3 embryos
14 to 18 days : 2 embryos
26 to 27 days : 3 embryos

With the exception of one individual, all embryos that had developed to or beyond the size of a normal

9-day embryo appeared to be perfectly formed. All except one of the advanced embryos were produced by daughters of a male with a history of retarded sexual maturity. Cytological studies indicate that the parthenogenetic embryos carried the diploid chromosome number (Yao, unpublished). In each of four instances where sex was determined, the embryo was found to be a male. These and other observations made during 1954 will be described in greater detail elsewhere.

References

1. M. W. Olsen and S. J. Marsden, *Proc. Soc. Exptl. Biol. Med.* **82**, 638 (1953).
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Communications

Education or Training?

The publication of William Seifriz's article on "A new university" [*Science* **120**, 87 (16 July 1954)] has impelled me to present this communication, the thesis of which is at least tangential to his. During the spring of 1954, I attempted in a very limited and informal manner to learn something of the cultural backgrounds of 15 candidates for the doctorate in botany, horticulture, agronomy, and zoology at the University of Illinois. My procedure was simple: at that point in the oral examination of each candidate at which the chairman of the examining committee places his palms on the table's edge, looks hopefully at the other members of the committee, and says, "Well, gentlemen, are there further questions?" I asked each candidate to identify as specifically as he could the following items; beneath each item are listed the numbers of satisfactory (S) and unsatisfactory (U) responses:

The Renaissance: S, 6; U, 9.
The Reformation: S, 5; U, 10.
The Monroe Doctrine: S, 2; U, 13.
Voltaire: S, 5; U, 10.
The Koran: S, 10; U, 5.
Plato: S, 7; U, 8.
The Medici Family: S, 1; U, 14.
Treaty of Versailles: S, 11; U, 4.
Bismarck: S, 4; U, 11.
Magna Carta: S, 2; U, 13.

I have made several interesting observations on these results: (i) Of the two students who gave an acceptably specific identification of the Monroe Doctrine, one was a Canadian. (ii) Only one student gave an acceptable identification of the Medici family; of the remaining 14 students, 10 had not even heard of the Medicis. (iii) Of the three students who turned in the best performances, one with 9 acceptable answers, two with 7 each, two were graduates of small liberal arts colleges. (iv) One student, a graduate of one of our largest state universities (*not* the University of Illinois!), failed to give a single acceptable answer. (v) The best score (9 acceptable answers) was that of a Canadian student (the other 14 were native-born citizens of the United States). (vi) Only two students were able to identify specifically Magna Carta, one of the great documents in the evolution of human political freedom; of the remaining 13, seven had not heard of Magna Carta. (vii) In a country in which the dominant religion is Christianity, twice as many students were able to identify the Koran as were able to give a satisfactory identification of the Reformation.

It is tempting to speculate upon the bases of these conclusions and upon their significance, but, since the sample was a small one (inevitably so, for the news of questions asked of doctoral candidates travels rapidly through the graduate student grapevine), one is justified in drawing but a single conclusion: perhaps we are overtraining both our graduate and undergraduate students to the detriment of their education.

One of my colleagues in history, interested in my little project, has, with my aid, drawn up a list of 10 notable theories, discoveries, and persons in the history of science and will try this list on doctoral candidates in the humanities to determine whether or not they are as poorly educated in science as my victims appear to have been in the humanities.

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Scarcity of Instrument Makers

During the past few years, much has been written about the scarcity of scientific personnel—a condition that may still exist but is becoming less acute.

Less attention, however, has been paid to another scarcity that is of longer duration and is, perhaps, more serious. I refer to the scarcity of instrument makers, the men who design and build the tools used by scientists, the "fine instruments" of long ago.

For years, we have been under the necessity of importing our scientific apparatus from Europe where the apprentice system has been—and still is—in general use. The apprentice served 4 years or more in the shop to learn the methods commonly used and then worked as journeyman or improver, learning more about his chosen profession in every shop.

In the United States the apprentice system is no more. Instrument manufacturers now employ toolmakers, lathe and milling machine hands, and so forth, who, while they may be excellent mechanics, know little about the simplest instrument, not even its use. The result is that no men are being trained in the