examination. When the entire period is to be used for this form of test, the procedure is somewhat altered. Care is taken to provide at least as many objects as there are students in the class. Each student begins at a certain object, and proceeds to every other object in turn, until she returns to the one from which she started. To avoid confusion, every girl moves at the same time, on a signal given by the teacher.

Certainly a test of this type means work. It requires work on the part of the teacher who must spend hours planning the questions. It requires work on the part of the laboratory assistant who must dig out set-ups which were used weeks before, or perhaps even set them up again. It means work on the part of the head of the department who must arrange for special shifting of classes so that the test may be set up in the room best suited for the purpose. Is it worth all this effort?

Personally, I like this type of test, and before concluding, I should like to point out why.

1. *The students like this form of test.* It is different from the regular run of tests.

2. *The test is really diagnostic.* It can show the teacher where reteaching is needed.

3. *The test is really a teaching device.* Pupils frequently ask questions concerning an object after the test, whereas they failed to ask when the same object was presented as part of the class work.

4. *The test really measures how consistently a student has done his work.* It is next to impossible to "cram" for a test of this sort. A student who has conscientiously and carefully considered all the materials presented to the class, will have no difficulty with such a test. A student, no matter how bright, who has been negligent with the expectation of reading his textbook just before the exam, will not do well.

5. *This type of test presents a means of measuring the biological knowledge of girls and boys who have difficulty in understanding written questions.* Students who read poorly, frequently fail on tests as a result of lack of comprehension, rather than lack of knowledge. (To illustrate, take the case of a girl in the special low I.Q. group previously mentioned. Her oral answers in class are generally satisfactory if the question is made clear, yet she has never gotten more than 45% on any of the four written tests she had so far during the term. On the "Practical Test" which was part of the mid-term examination, her score was 32 correct out of 40.)

6. *This type of test may, in its highest form, measure objectively the student's ability to observe, his reasoning power, and his understanding of scientific method, far more adequately than any written test.*

In conclusion, I should like to ask the reader not to pass judgment upon this type of test without trying it once or twice. The idea is not new. It has been used in the colleges for a long time. We in the high schools have not taken advantage of the opportunities it presents.

THE USE OF LABELLED DRAWINGS IN THE TEACHING OF COMPARATIVE ANATOMY

It is high time that teachers of comparative anatomy and similar courses decide just what it is that they are trying to teach—art or anatomical detail and relationship. It seems to me that under the observe-and-draw method far too much time is spent in completing a presentable drawing and far too little is

spent in observation—the most pressing need, as far as the student is concerned, being to prepare a drawing, by some hook or crook, that will pass the instructor's inspection and parenthetically I may remark that the greater the number of students (and consequently drawings) per instructor the less likely is his inspection to be continuously rigid. Under such a procedure it is usually the practice to limit or prohibit the use of labelled illustrations during the laboratory period (for fear the student will copy them). The assumption seems to be that by following written or oral instructions the student will be able to make the dissections, recognize the features, and, by preparing a sketch of them, fix them in mind. Any experienced teacher knows that these assumptions are largely false. The fact is that the average student must be shown many of the structures by an instructor or the instructor's agent (in the form of labelled diagrams); and it is equally true that the preparation of sketches is not necessary to fix anatomical details in mind, as any teacher or student of medical anatomy well knows.

Apparently then the only real purpose served by the preparation of formal drawings is to furnish incentive for the student to make the observations and to guarantee that he has done so—and at what a cost in students' and instructor's time! An equally effective incentive is to be supplied by rigid oral quizzes over the students' own dissections and I submit that such a practice eliminates the chance to copy or to substitute anything for actual observation, and time otherwise used for preparation of drawings is available for dissection and study. From experience I know that the effort induced by the prospect of an oral quiz is normally sufficient to fix the material in mind. Further, with the temptation to copy printed drawings removed the student is free to use labelled illustrations as aids in recognizing structural details and relationships.

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Biological Briefs

MURPHY, ROBERT CUSHMAN. *Conservation's Silver Lining.* Natural History 46: 294–303. December, 1940.

The past history of the Peruvian guano industry has been one of discovery, exploitation, and ruin. The conversion of this situation into the status of a true and lasting industry is one of the greatest examples of practical conservation now known.

The biological background involves the interaction of the sun's heat and the winds to determine the course of the cold Humboldt current, normally carrying a rich marine flora and fauna northward along the Peruvian coast. At such times, the abundance of bird life increases enormously, and heavy layers of guano accumulate on a series of coastal islands. A rainless climate permits the guano to maintain its fertilizing efficiency by sealing in the organic compounds otherwise lost by leaching and evaporation. Occasionally, however, a warm surface current moving southward replaces the Humboldt current; then conditions for life become unfavorable, and fishes and birds die in myriad numbers. This cycle occurs about once each seven years.

Between 1840 and 1900, the birds were considered a nuisance to the miners working the seemingly inexhaustible supply of guano, and many species could lay no eggs because of extensive mining. Then the deposits were depleted, and