LETTERS

SIRS: In a letter published in the April E & S one of your readers posed a problem:

"Given twelve balls identical in appearance, eleven of which are identical in weight. To find which of the twelve is the odd ball, *and* whether it is heavier or lighter, in three weighings on a pan balance."

O.K. I—for one—can't get the answer. What is it?

New York City T. L. Kelly '30

There are probably half a dozen ways in which you can reach a solution to this one, but here's one way to do it. Give each ball a number for convenience. First, weigh numbers 1-4 against numbers 5-8 (inclusive). If these don't balance —and say numbers 1-4 are heavier —the second weighing might be numbers 1, 2, and 12 against numbers 3, 4, and 5. If, for example, the pans then balance, the odd one must be number 6, 7, or 8, and must be light. Weighing any two of these against each other will tell which of the three is the light one.

If, on the other hand, the second weighing does not balance, and assuming that numbers 1, 2, and 12 are heavier, weighing number 1 against number 2 will suffice to locate the odd one and to indicate whether it is heavier or lighter.

If the first weighing balances, the second might be numbers 9 and 10 against numbers 1 and 11.

In general, you should never make a weighing that is certain to be unbalanced—such as six balls against six at first, for example—because it's inefficient and won't allow solution in three weighings.

—Editor

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SIRS: In the "letters" column of your April issue a reader suggested you run a regular puzzle section in E & S. Here are a couple to start on. These problems were invented by J. Marvin Blair—a graduate student who gets his M.S. this

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PICTURE CREDITS

Cover—Hugh Stoddart
pp. 3-6—Hugh Stoddart
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p. 13—From the magazine Civil Engineering
pp. 14-15—Drawings by Harry Diamond
pp. 16-17—Ross Madden-Black Star
p. 23—Drawings by J. Marvin Blair

Charles E. Burdg is at General Electric's Erie plant, working in the Refrigerator Works Lab, where most of the electronic measuring and testing devices are designed and constructed. He's on a six months "signup" as Test Engineer, will move on about August 1.

Richard Davis has spent the past year in Scotland at the University of Edinburgh, writing his thesis for his Ph.D.

Theodore R. Goodman, M.S., is an aerodynamacist at the Cornell Aeronautical Laboratory in Buffalo. He'll have a paper published soon in the Aeronautical Sciences Journal.

George Huffard got an MSEE at the University of Washington and is now working for the Central Radio Propogation Laboratory at the National Bureau of Standards, making theoretical analyses of tropospheric phenomena.

Walter Bonner, Ph.D., writes: "For the past three years I have been a Research Fellow in Biology at Harvard University. During this time our family was enlarged by one son, born November, 1947. I now plan to spend the following year, until August, 1950, in Cambridge, England, having recently been offered a fellowship by the Committee on Growth of the National Research Council, acting for the American Cancer Society."

Ted Dehnke, who is still with Dow Chemical in Midland, Mich., reports the birth of a son last February.

1947

Richard A. Boettcher, M.S., is with the Arabian American Oil Company in Dhahran, Saudi Arabia. His family, including a baby girl born January, 1948, joined him in May.

Fernand de Percin, M.S., is a Climatologist in the Office of the Quartermaster General in Washington. He was previously an Instructor in the School of Mineral Industries, Pennsylvania State College. His son, Fernand, Jr., was born March, 1947.

R. M. Clock, M.S., is in the Mechanics Department of the U. S. Military Academy at West Point.

Richard L. Felberg is the father of a baby girl born April 13. Felberg is with the Water Department in Earp, Calif.

John W. Bennett, M.S., was promoted to Captain in the U. S. Air Force last October, and is now stationed at Elgin AF Base, Florida. He's in the Proof Test Division, conducting operational suitability tests on USAF aircraft and allied equipment.

Bob Ilfeld joined the General Electric Co. after leaving Caltech, and is now Sales Engineer in their Special Products Division. He and his wife Winona have bought a house in Schenectady and expect to settle down there. Bob is active in the Edison (Country) Club, the Physics Program Alumni, and the church. Mrs. Bob is a leader in the American Association of University Women.

1948

Conway W. Snyder, Ph.D., joined Fairchild Engine and Airplane Corp., in Lexington, Ky., this spring, working on their NEPA (Nuclear Energy Propulsion of Aircraft) Project. He's setting up a research program, using the electrostatic accelerator of the University of Kentucky, to measure inelastic scattering cross sections of neutrons in heavy elements to obtain basic information required for reactor and shielding calculations. Formerly Snyder was with the Nuclear Physics Branch of the Office of Naval Research.

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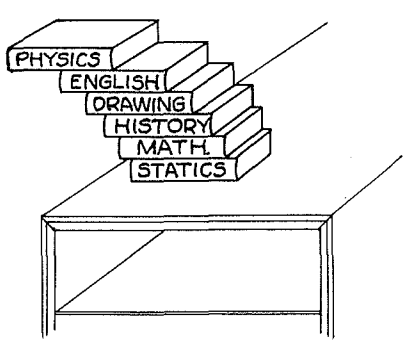
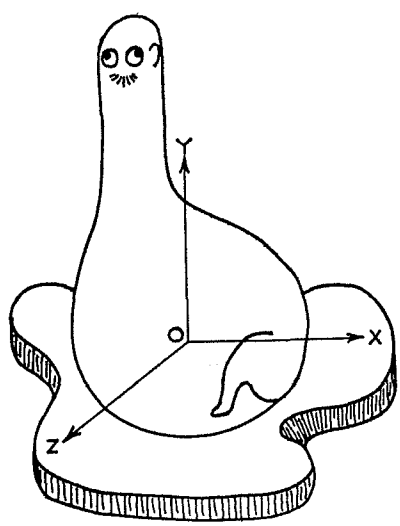
year—for his class in Applied Mechanics 1a. Blair drew the pictures too.

One of the girls in the Bookstore was a bit careless in handing out a stack of books with the result shown. If the stack is in equilibrium and each book is equal in size and weight and overhangs the one below by the maximum possible distance, by how much does the Math book overhang the Statics book?



The shmoo is sitting on a flat rock and thinking. His center of gravity is at 0. With reference to a set of coordinate axes through 0, the equation of his bottom is $2x^2 + 3y^2 + 2z^2 = 12$. The shmoo is in equilibrium in his present position. If he is jostled slightly, will he fall over, remain in the displaced position, or return to a vertical position? Why?



Incidentally, the shmoo has been thinking about this problem for several days instead of providing Grade A milk and eggs, so help him out.

Caltech — R. R. Martel, Professor of Structural Engineering

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SIRS: At present I am attending UCLA, taking courses in Business Administration with a Production Management major. It seems to me that many of the courses under this major should be given to all engineers. It would not only help them in their work; it would help them get ahead in the field. These courses, offered at UCLA, include Production Control, Time and Motion Study, Purchasing, and other phases that an engineer too often knows little about. I would like to recommend that a course or two be set up for future students so that at least a survey as to what should be known is given the engineer. These are now offered to the engineer at UCLA and Cal.

Pasadena — Richard A. B. Knudsen, '44