scene facts about the stages by which automobile designers arrive at their final model were revealed by George J. Mercer, consulting body engineer of Detroit.

Here is an approximate recipe for producing next year's motor:

Conservative Plus Radical

Take one part each of conservative body designer and artist with radical design tendencies. Let them produce drawings of what they would like the new car to look like on the assumption that the factory can produce anything. Then add two parts "practical" engineers who can season the extreme designs with knowledge about tool and die costs. Mix in a dash of public opinion as determined by questionnaires and test the mixture on a small group of executives.

Strange as this procedure may seem, it is one method of arriving at the new models. Inherent difficulty is that few people, either in the industry or out, have any concrete ideas of what they want. In the main they can only tell what they don't want, Mr. Mercer indicated.

Napoleon's comment that the only thing worse than an army with a poor general was an army with two good ones is equally applicable to body design, said Mr. Mercer. Final decision on the body style choice must be left to a small committee which may well have one woman member.

Final step in production is spreading the work out as widely as possible so that secrecy may be preserved. The idea is that while many people may know a few details it will be difficult for a competitor to get enough pieces of information together to make sense.

Science News Letter, June 6, 1936

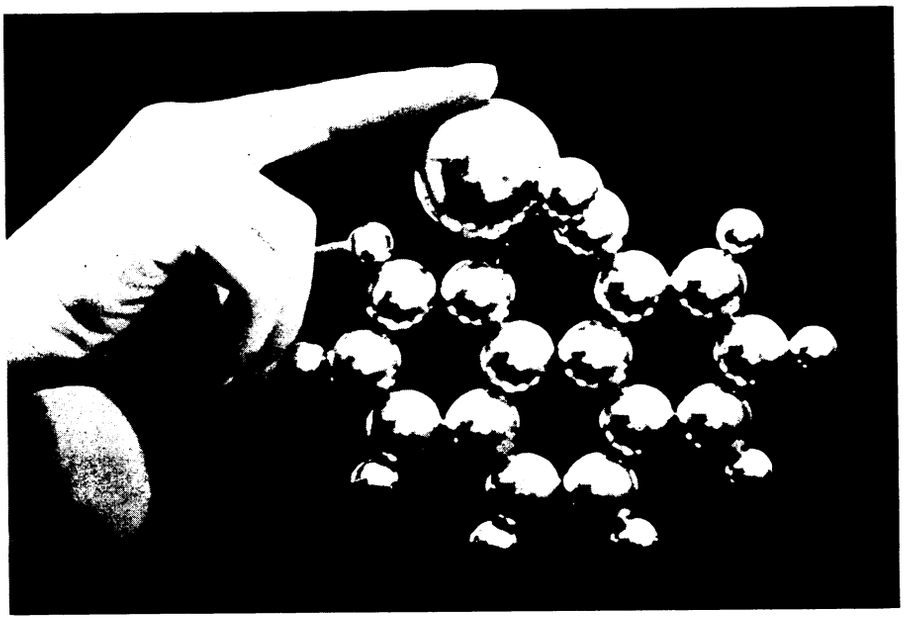
ORNITHOLOGY

First Adventure of Young Robins Pictured

See Front Cover

JUST a couple of young robins, big enough to leave the nest but not quite ready yet to "go it alone" in the wide world provide the subject for the front cover illustration of this week's SCIENCE NEWS LETTER. They hang onto their twig with all the grip there is in their small toes—for there may be a cat on the ground. The photo is from the camera of Cornelia Clarke.

Science News Letter, June 6, 1936



MODEL OF COMPLEX MOLECULES

With aluminum spheres whose relative sizes accurately picture the sizes of the different atoms chemists can now foretell whether they can build up complex organic molecules. Above, the chemist's hand is trying to add a large iodine atom to an already complicated molecule. Because the iodine atom is so big, it will not join on to the model at its proper place. Thus the chemist knows he cannot prepare the compound known as 5-iodo-4-nitro-phenanthrene, except perhaps in an indirect way. Dr. R. E. Steiger of Swarthmore College developed the molecular models.

CHEMISTRY

Large Models of Molecules Predict Chemical Facts

By DR. W. E. DANFORTH, Bartol Research Foundation of the Franklin Institute

A WATCH designer, in order to facilitate his work, may construct a model several times larger than the finished time-piece will be.

How convenient it would be for the organic chemist if he, likewise, could enlarge the molecules with which he deals to a size of several inches. Instead then of vainly attempting for months to prepare a certain compound, he could have seen at the outset that the method he was using could not possibly lead to the desired result.

The organic chemist is always anxious to know just how closely atoms or groups of atoms, appearing in the molecules of a compound, approach each other in space. With this knowledge he could foresee whether or not certain phenomena would take place.

To represent organic molecules correctly, models should be composed of spheres made to the scale of the atoms with a properly chosen magnification. Moreover, the spheres should not be separated by rods as are those in the old-type models.

This has been fully realized by Dr. Robert E. Steiger of Swarthmore College. His "Organospheres" are 172,410,000 times the actual size of the non-metallic atoms one is most likely to find in organic substances. Made of solid aluminum, they can be connected to each other, at specific points ("valence points") on their surfaces, by means of pins which are no longer visible once the connection has been effected.

To speed up construction of the desired models, complete sets of Organospheres contain assemblages of two or more spheres corresponding to the groups of atoms most frequently occurring in organic compounds.

George A. Bourdelais of the Engineering Division of Swarthmore College deserves great credit for having successfully solved the serious technical diffi-