Communications

New Technique for Motivating and Reinforcing Children

To the extent that motivation and reinforcement have been systematically manipulated in research with children, typically poker chips or marbles have been used as secondary reinforcers, these to be collected by the child and cashed in for a piece of candy or small toy. This method, although successful, is cumbersome and sometimes delays experimental progress while the child manipulates the token reinforcer. Also, objections from nursery-school personnel may be incurred for the reasons that (i) candy is not good for children, or (ii) toys are disruptive when taken back to the play group. Although to the experimenter these objections may appear to be of little consequence, nursery-school personnel may consider them extremely important, and the opportunity to use children often depends on the consent of a nursery-school teacher or administrator. Partly as a consequence of these problems I have developed a technique that avoids the afore-mentioned difficulties and, through its flexibility, offers a number of interesting possibilities.

The essence of at least one type of reinforcement that is useful in the control of behavior is the contingency of the continuation of a pleasant or interesting state of affairs on the occurrence of a specific bit of behavior. Thus, any situation that will entertain a child and can also be readily turned off and on would serve this purpose. Both movies and music would appear to meet these latter criterions. Although movies might be expected to be more entertaining, I had a tape recorder, rather than a projector, at hand and have used music as a reinforcer with striking success.

Children's records were transferred to tape, and a delay interval timer was placed in the earphone circuit of the tape recorder in such a way that the music is cut off at preset intervals and can be turned on at the touch of a button. Normal children as young as 3 yr of age will stay in this situation for at least 30 min while pressing a button every 10 sec to continue the music. Greater flexibility is achieved by using a foot switch under the control of the experimenter to turn on the music. This arrangement permits the reinforcement of more complex responses. For example, mentally retarded children have been taught various concepts by reinforcing the response of pointing to a particular card or object of a pair placed on a table in front of the child. Also, a speech pathologist has given and withheld reinforcement for successive approximations to the desired speech sounds. In both of these situations the rapidity of learning has been marked, and both the experimenter and the speech pathologist have been very enthusiastic about the device.

Neither a tape recorder nor interval timer would appear to be essential, but it is my guess that the earphones may enhance the effect and tend to limit extraneous behavior of the child. Otherwise, a simple on-off switch in the speaker circuit of any record changer would probably serve if the actual control of the music is to be left to the experimenter. Certainly a variety of other arrangements is also possible.

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Bonding in the Lanthanon Chelates

A criterion proposed by C. W. Davies (*1*) to distinguish between essentially ionic bonding and covalent bonding in electrolytes may be utilized to obtain information on the nature of the lanthanon chelates. The criterion proposed by Davies consists of two parts: (i) The behavior of alkalies and heavy alkaline earths is typically ionic. (ii) The logarithms of the ionization constants (in this case of the instability constants) will be directly proportional to the square of the ionic charge Z and inversely proportional to the ionic radius r. Although the application of the second part of this criterion to lanthanon complexes has been discussed (*2–4*) using data on two or three of the lighter lanthanons, a lack of experimental data has previously prevented its strict application to the lanthanons as a whole.

In Fig. 1 this criterion is applied to the data of

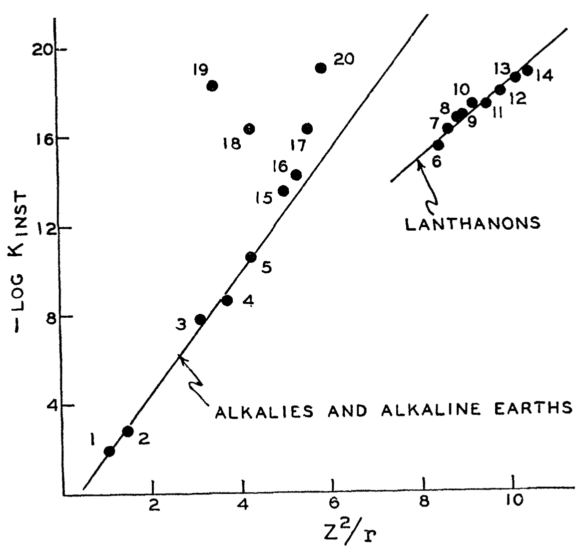

Fig. 1. Relationship between the logarithm of the instability constants and Z^2/r for metal chelates with ethylenediamine tetraacetic acid. (1) Na^+, (2) Li^+, (3) Ba^{+2}, (4) Sr^{+2}, (5) Ca^{+2}, (6) La^{+3}, (7) Ce^{+3}, (8) Pr^{+3}, (9) Nd^{+3}, (10) Sm^{+3}, (11) Gd^{+3}, (12) Dy^{+3}, (13) Er^{+3}, (14) Yb^{+3}, (15) Mn^{+2}, (16) Fe^{+2}, (17) Co^{+2}, (18) Cd^{+2}, (19) Pb^{+2}, (20) Ni^{+2}.

Vickery (*5*) and that collected by Martell and Calvin (*4*) on ethylenediamine tetraacetic acid chelates. The ionic radii of the lanthanons have all been obtained from the work of Templeton and Dauben (*6*) and those of the other elements from Ketelaar (*7*). Davies considers that covalent bonding occurs in those cases in which the stability of the bonds is *greater* than that expected for an alkali-like ion of identical Z^2/r value. It is apparent from the figure that the lanthanon chelates are ionic in nature, the stabilities actually being less than expected. Their behavior contrasts markedly with that of the transition elements included in the figure for comparison. A possible explanation for the behavior of the lanthanon chelates lies in the small size of the ions and their large charge. The required number of chelate groups are prevented from approaching one another as closely as expected in the resultant complex because of their mutual repulsions. An extension of the figure would show that the Fe^{III} and Cr^{III} complexes are less stable than expected for ionic bonding. This does not prevent considering these as ionic complexes in spite of the optical stability of any resolved complexes. Such stability is primarily dependent upon the magnitude of the instability constant rather than the type of bonding.

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New Hemoglobin Possessing a Higher Electrophoretic Mobility than Normal Adult Hemoglobin

We have observed a new abnormal hemoglobin, moving with a higher electrophoretic mobility than the normal adult hemoglobin, in two members of a Chinese family. This is the sixth abnormal hemoglobin discovered since Pauling *et al.* (*1*) characterized the first abnormal hemoglobin in sickle cell anemia.

Five members of this family have been studied since we first saw one of them in our office on 23 Mar. 1954; they are represented by solid enclosures on Fig. 1. They were seen because of a severe hypochromic, microcytic anemia that was indistingishable on stained smears from hereditary leptocytosis, first noted in patient 9. A similar picture was detected in the blood of patient 10; and both patient 9 and patient 10 give a lifelong history of easy fatigability and both have splenomegaly. Blood from subjects 1, 2, and 8 showed no abnormality.

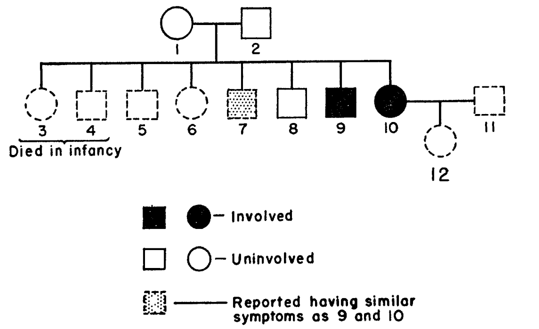

Fig. 1. Genetic table of family showing occurrence of new abnormal hemoglobin.

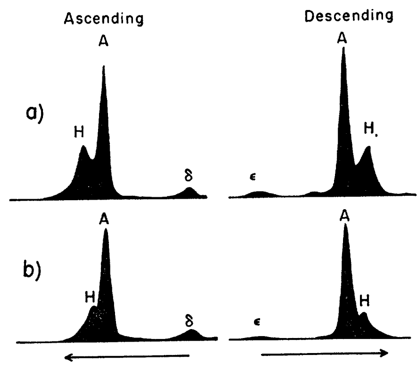

Fig. 2. Electrophoretic patterns of hemoglobin: (*a*) from subject 10; (*b*) from subject 10 mixed with normal.

Electrophoretic analyses of hemoglobin from subjects 9 and 10 performed at that time in Veronal buffer *p*H 8.6, ionic strength 0.1, revealed two distinct hemoglobins, as is shown in Fig. 2*a*. The slower one has the same electrophoretic mobility as the normal adult hemoglobin, as can be seen in Fig. 2*b*, where hemoglobins from a normal individual and patient 10 were mixed. The faster hemoglobin, accounting for 35 percent of the total, is abnormal and is hitherto undescribed. Electrophoretic patterns of subjects 1, 2, and 8 showed only adult hemoglobin.

Since hemoglobin G is the most recently described (*2*), it is proposed that the abnormal hemoglobin described here be designated as hemoglobin H. The genetic pattern does not seem to follow that of other abnormal hemoglobins, since neither parent possesses the abnormal hemoglobin.

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