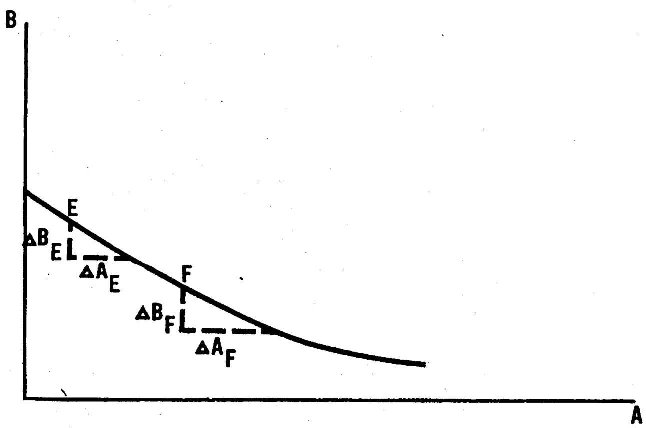
Several other important points about the diagram should be noted: The lowest level of productivity, represented by curve 1, is asymptotic to B_{min}, which represents the minimum of GS-14s+ that must be hired to reach any positive level of productivity. Moreover, all the curves have a flat, negative slope throughout. The negative slope indicates that both A and B have positive productivity, i.e., there is no negative productivity. The curve's flatness indicates that, in any possible input mix, the GS-14s+ are always more productive than the GS-13s−; that is, assuming that we seek to maintain the same level of productivity, if B is decreased by 1, we must increase A by more than 1.

Also, the isoproductivity curves are convex to the origin:

$$\left(\frac{dB}{dA} < 0, \ \frac{d^2B}{dA^2} > 0 \ \text{ for } A > 0, \ B > 0\right).$$

This property depends upon the assumption of diminishing marginal productivity. For example, refer to Figure 2: At point E on curve 1, a decrease ΔB_E in the number of GS-14s+ requires an increase ΔA_E in the number of GS-13s− in order that total productivity remain constant.

Figure 2



However, at point F, where the relative number of GS-14s+ is smaller, the same decrease in the number of GS-14s+ ($\Delta B_F = \Delta B_E$) requires a larger increase in the number of GS-13s− ($\Delta A_F > \Delta A_E$) to keep the total productivity constant. This condition does not appear unreasonable, for the GS-14s+ may perform some tasks more efficiently than the GS-13s−. If the curves were concave to the origin, this would be equivalent to making an assumption of increasing marginal productivity; i.e., as the GS-14s+ become relatively fewer, it will take fewer and fewer GS-13s− to replace the same number of GS-14s+.

3. Maximizing Productivity, Given a Budget Constraint

Suppose the isoproductivity curves are represented as in Figures 1 and 2. Let P_A = salary (cost) paid a GS-13−; let P_B = salary (cost) paid a GS-14+; and let Q = the total budget available for salaries. Then, $P_A \cdot A + P_B \cdot B \leq Q$. Now, superimpose this linear budget constraint on the productivity contour surface, as in Figure 3.