

may be given in detail by a certain apparatus.

But what is to be said in approval of a curve of the iron produced every year? Or of a curve of births and deaths and the number of men getting married every year (see Picture 36)? Is there an amount of iron produced in a year for every minute of the year? Certainly not. What possible sense have these between-points? If one gave much thought to this question one might get some sort of sense: the year's produce for every possible sort of year, not only our calendar year—but this is without reason and was certainly not in the mind of the designer of the curve. There is a way out for the designer of curves: separate points of the time line have to be representative not of the years, but only of their start or end, so that limited equal parts of the line are representative of the years. In place of points the designer has to make small parallel lines to the time line and he will get a stepped curve in place of the other curve of bent lines (like Picture 26). This stepped curve has a certain sense from the point of view of mathematics. It has sense to say: we may get nearer and

nearer to the true development. If, for example, the amounts produced are given for half years, there will be two steps in place of one, and if the amounts are given for the months, there will be 12 steps in place of one. Not the distance between time line and curve, but the plane between time line and curve is representative of the amounts produced. The distance is representative of the amounts produced in a unit of time, the mathematics expert will say. But this expert will see no sense in the first curve of bent lines between fixed points—it is nothing but a connection between separate points. Only these separate points have sense: the curve has no sense at all. Further, the curve of births and deaths—even if designed as a stepped curve—is not able to give such a clear and living picture of births and deaths as the ISOTYPE picture (Picture 31).

Every process, however simple, has to be in harmony with the rules of logic and mathematics. No process, however clear-cut, and however well based on science and delicate thought, will have any value for science or for education if it is not in harmony with the rules of this poor