only a necessary and not a sufficient condition for good rectification. It is also necessary to have a local oscillator of sufficient amplitude in order to be able to make full use of the rectifying properties of the contact and, in turn, the local oscillator power may be limited by the noise it generates in the crystal. However, given the power of the local oscillator, the size of the contact has to be made small. The contacts actually used fulfill condition (7) by a considerable margin. A capacity of 1 cm. which corresponds to the average of the rectifiers measured by Dr. Beringer will give $a = 6 \cdot 10^{-4}$ cm. so that Expression (6) has the value 0.4. Lawson, of the University of Pennsylvania, has studied contacts with a varying from about $3 \cdot 10^{-4}$ to 10^{-3} cm.

The requirement of small point contact explains the function of tapping* in producing a good rectifier. As the cat's whisker is brought into contact with the crystal surface for the first time, the relatively soft tungsten is caused to flow plastically and to assume the shape of the silicon surface. Then the tapping will move the cat's whisker to a different area on the silicon which will have different irregulatities from the area first touched. Therefore, the cat's whisker will now make contact only in a few points rather than over the entire flattened surface (Fig. 2). This will obviously improve the rectifying characteristics.

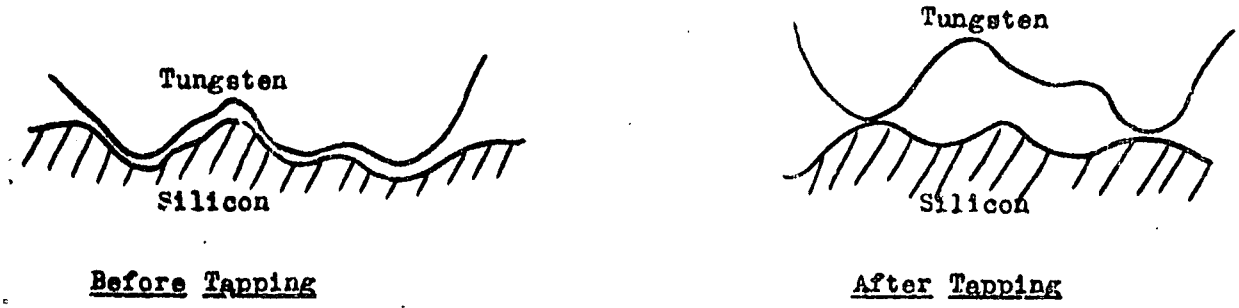

Fig. 2

*The following picture of the phenomena involved in tapping was suggested to me by Dr. Schiff of the University of Pennsylvania.