2. Research at the Max-Plank-Institute für Metallforschung, Stuttgart

2.1 Ion Irradiating Damage in Co

2.1.2 General Stuff

- This relates to my **diploma thesis**work (Fall 73 - fall 74). If memory serves, we had to do all the work in just 1 year (no time limit before about 72). Of course, the old-timers were sure that not much could come out in such a short time. They were wrong. I (and many of my colleagues) did come up with a decent thesis. Quite decent, in fact, if one considers that we all started at zero. I had never seen a transmission electron microscope (***TEM***) before, not to mention operated one. Worse, I had never prepared a TEM specimen. And then I had to learn that TEM work is (or at least was) mostly specimen preparation, an activity something counted, with good reasons, among the black arts.
  Then there was theory to learn; quantum theory, to be precise. Not my strong point then (or later). And all about defects in crystals (my strong point actually, see this link).
  - My thesis turned out to be quite good. I not only got the required pictures plus interpretation, I improved upon the theory and used a tricky procedure for the first time to evaluate the pictures. And I used a "desk computer" with around 1 MB memory space!

    Here are the links to all chapters of the thesis:
    Chapter 1-2
    Chapter 3-4
    Chapter 5
    Chapter 6-8
    Chapter 9-10
- The work was finished in Sept 74 and netted 2 publications that, for some reasons I forgot, appeared rather late (1977 / 78). Americans then would have turned out at least 5 publications and in our present and enlightened times even more. However, back in the 70ties, electron microscopy was a gentlemen's business, dominated by the Oxford group, and my May-Planck-Institute also felt that it would not lower itself to the plebeian levels of the Americans who could not grasp the difference between publication and public relation.
  What we published was:

12 **FÖLL, H., WILKENS, M: TEM studies of dislocation loops in heavy ion irradiated H.C. P. Cobalt. Phys. Stat. Sol. (a) 39 (1977) 561** 2

13 **WILKENS, M., FÖLL, H.: The black-white vector I of small dislocation loops on TEM images. Phys. Stat. Sol. (a) 49 (1978) 555**

- The journal "Physica Status Solidi", while highly regarded, was actually an East German periodical. Made by communists! No self-respecting American would publish there. My institute, however, used it quite frequently. and so did I in much later years.
- Dr. **Manfred Wilkens** was a "Max-Planck director" and the head of the electron microscopy group in the Max-Planck-Institut für Metallforschung; Institut für Physik. He was thus very close to God for us newcomers. Above him was only Prof. Dr. **Alfred Seeger**, who, for all practical reasons, was God or at least a close relative.
  The first paper (almost completely my work) reports (in short) essentially my diploma work. It contains the pictures shown here in the picture section,. With 41 citations it was surprisingly well received. The second paper enlarges on an idea I had as part of my diploma work. It is theoretical and shows how the analysis of what one sees on a TEM picture (a "**micrograph**) could be substantially simplified by using a clever approximation in the theory of "black.-white" contrasts. Working out the theory in more detail was mostly Wilkens work