cm^2, which can be determined very accurately by measuring beam current density of the system and implant time, one can calculate the profile of implanted ion concentration at varying depths. As with any particles with charges, the electromagnetic lenses and beam scanner can be used to form practically any variation of ion concentration at the substrate, and particularly to form progressive zonal lens having the optical characteristics of FIGS. 6A and 6B. Similar results can be achieved by using masks of varied density. The vision corrective effect would correspond to that produced by the posterior surface undulations in the lens of FIG. 4.

FIGS. 8A, 8B and 8C show, respectively, a corneal inlay lens, a corneal onlay lens, and an intraocular lens, each incorporating the concepts of the present invention. In the corneal inlay lens 80 of FIG. 8A, and in the corneal onlay lens 82 of FIG. 8B, the illustrated progressive zonal variations are accomplished with the variable refractive index of lens material 84, as described in conjunction with FIG. 7.

In the intraocular lens 86 of FIG. 8C, the posterior surface 88 is shown as an undulating surface having progressive zonal variations comparable to those in FIG. 4.

Any of the three lens implants of FIGS. 8A, 8B or 8C could use either the surface variations or the refractive index variations, and also could use either the anterior or posterior surface as the multifocal surface.

The implanted lenses of FIGS. 8A, 8B and 8C are subject to the same problems as are the contact lenses, e.g., pupil size variations and decentration problems. The pupil size problems are essentially the same. The decentration problems are less pronounced with implanted lenses, but are nevertheless significant because operational procedures do not insure centration, and, in the case of intraocular lenses, postoperative movement can be quite noticeable.

From the foregoing description, it will be apparent that the apparatus and methods disclosed in this application will provide the significant functional benefits summarized in the introductory portion of the specification.

The following claims are intended not only to cover the specific embodiments disclosed, but also to cover the inventive concepts explained herein with the maximum breadth and comprehensiveness permitted by the prior art.

I claim:

1. A multifocal ophthalmic lens for providing variable vision correction power, said lens being adapted for implantation in an eye or to be carried on a surface of the eye, said lens having a central zone providing a predetermined vision correction power and a plurality of annular regions circumscribing the central zone, a first of the annular regions having progressive vision correction powers which vary progressively in a radial outward direction from said predetermined vision correction power at said central zone to one of near and far vision correction powers, said one vision correction power being different from said predetermined vision correction power, a second of the annular regions having the other of said near and far vision correction powers and a third of said annular regions having progressive vision correction powers varying progressively between the far and near vision correction powers, said third region circumscribing the first region and the second region circumscribing said third region.

2. A lens as defined in claim 1 wherein said annular regions are concentric.

3. A lens as defined in claim 1 wherein said lens is an intraocular lens adapted for implantation in the eye.

4. A multifocal ophthalmic lens for providing variable vision correction power, said lens being adapted for implantation in an eye or to be carried on a surface of the eye, said lens having a first region and a plurality of annular regions circumscribing the first region, said first region and at least one of the annular regions having a first vision correction power, another of said annular regions having a second vision correction power, said annular regions including an annular transition region extending between said first region and said another region, said one region circumscribing said another region, one of said first and second vision correction powers being a near vision correction power and the other of said first and second correction powers being a far vision correction power and said annular transition region having progressive vision correction powers which vary progressively between the near vision correction power and the far vision correction power, said annular regions including a second annular transition region which is between said another region and said one region, said second annular transition region including intermediate vision correction powers which are intermediate the near vision correction power and the far vision correction power and which provide vision correction for intermediate distances.

5. A multifocal intraocular lens for providing variable vision correction power adapted for implantation in an eye, said lens having a first region and a plurality of annular regions circumscribing the first region, said first region and at least one of the annular regions having a first vision correction power, another of said annular regions having a second vision correction power, said annular regions including first and second annular transition regions between said first region and said another annular region and between said another annular region and said one annular region, respectively, one of said first and second vision correction powers being greater than the other of said first and second vision correction powers and said first annular transition region having progressive vision correction powers which vary progressively from the first vision correction power to the second vision correction power and the second annular transition region having progressive vision correction powers which vary progressively from the second vision correction power to the first vision correction power.

6. A lens as defined in claim 5 wherein all of said regions are concentric.

7. A lens as defined in claim 5 wherein said first vision correction power is far vision correction power and said second vision correction power is near vision correction power.

8. A lens as defined in claim 5 wherein the second vision correction power is greater than the first vision correction power.

9. A multifocal ophthalmic lens for providing variable vision correction power, said lens being adapted for implantation in an eye or to be carried on a surface of the eye, said lens having a central zone for providing a predetermined vision correction power and a plurality of annular regions circumscribing the central zone, a first of the annular regions having a first vision correction power, a second of the annular regions having progressive vision correction powers varying progressively in a radial outward direction between the predetermined vision correction power and the first correc-