suring 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 having first and second zones with the second zone lying radially outwardly of the first zone, each of said zones having a first region with near vision correction power, a second region with far vision correction power and an intermediate vision region between the first and second regions, the intermediate vision region having varying optical refractive index values to provide progressive 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.

2. A lens as defined in claim **1** wherein the second zone surrounds the first zone.

3. A lens as defined in claim **1** wherein the first and second zones are concentric.

4. A lens as defined in claim **1** wherein each of said first and second zones is annular.

5. A lens as defined in claim **4** wherein the first and second zones are concentric.

6. A lens as defined in claim **5** including a central zone having an intermediate vision correction power.

7. A lens as defined in claim **1** wherein the ophthalmic lens is an intraocular lens.

8. A lens as defined in claim **1** wherein the ophthalmic lens is adapted for affixation to the cornea.

9. A lens as defined in claim **1** wherein the ophthalmic lens is a contact lens.

10. A lens as defined in claim **1** wherein the vision correction power varies progressively in transition from said first zone to said second zone.

11. A lens as defined in claim **1** wherein the vision correction power varies progressively in a radial direction throughout each of said first and second zones.

12. A lens as defined in claim **11** wherein the vision correction power varies progressively in transition from said first zone to said second zone.

13. A lens as defined in claim **1** wherein the far vision correction values of each of said first and second zones are the same and the near vision correction values of each of said first and second zones are the same.

14. An ophthalmic lens adapted to be carried by or in the eye for providing variable vision correction power, the lens having varying optical refractive index values to cause the corrective power to vary progressively in a radial direction in an annular zone from a first vision correction value through an intermediate vision correction value to a second vision correction value and then back through the intermediate vision correction value to the first vision correction value and the intermediate vision correction value being between the first and second vision correction values.

15. An ophthalmic lens adapted to be carried by or in the eye for providing variable vision correction power, the lens having varying optical refractive index values to cause the corrective power to vary progressively in a radial direction in an annular zone from an intermediate vision correction power through a far vision correction power and a near vision correction power and then back to the intermediate vision correction power and the intermediate vision correction power being between the first and second vision correction powers.

16. A multifocal ophthalmic lens for providing variable vision correction power and adapted to be carried by the eye, said lens having a plurality of zones, the lens having varying optical refractive index values to cause the vision correction power of each of said zones to vary progressively between a near vision correction value and a far vision correction value and then back toward an intermediate vision correction value, the intermediate vision correction value being between the near and far correction values.

17. An ophthalmic lens for providing variable vision correction power, said lens having a plurality of annular zones, the lens having varying optical refractive index values to cause the correction power of each of said zones to vary progressively in a radial direction between a near vision correction power and a far vision correction power, and the correction power varying throughout each of said annular zones and in transition between each of said annular zones.

18. An ophthalmic lens configured to be inserted in or onto an individual's eye in order to provide vision correction over a wide range of viewing distances, the lens comprising:

(a) a lens body having an optical axis and having an anterior face and a posterior face, one of said faces having first and second annular zones which are