STUDY OF DIODE LASER (USES & APPLICATIONS)

Essay

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by

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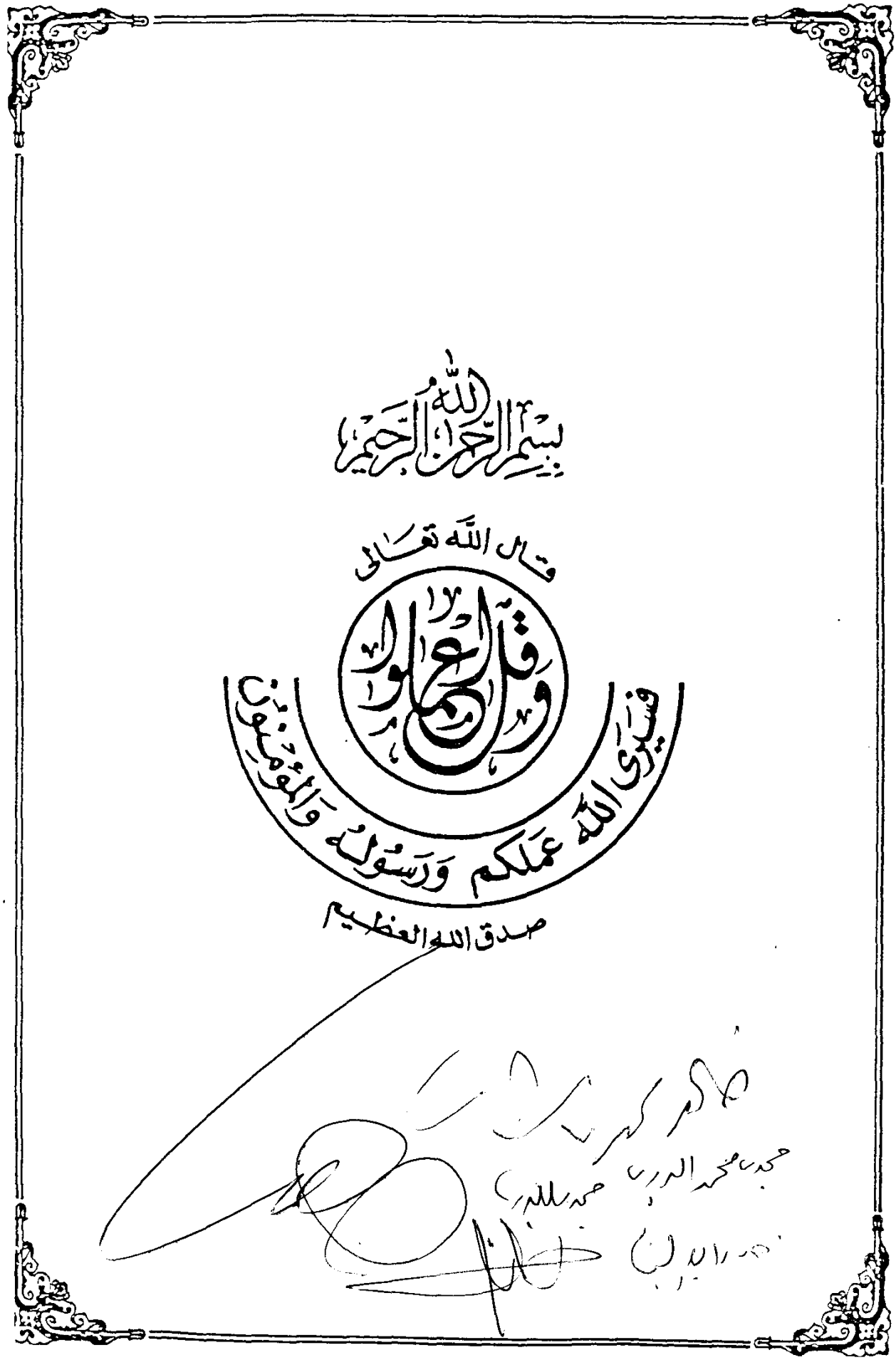

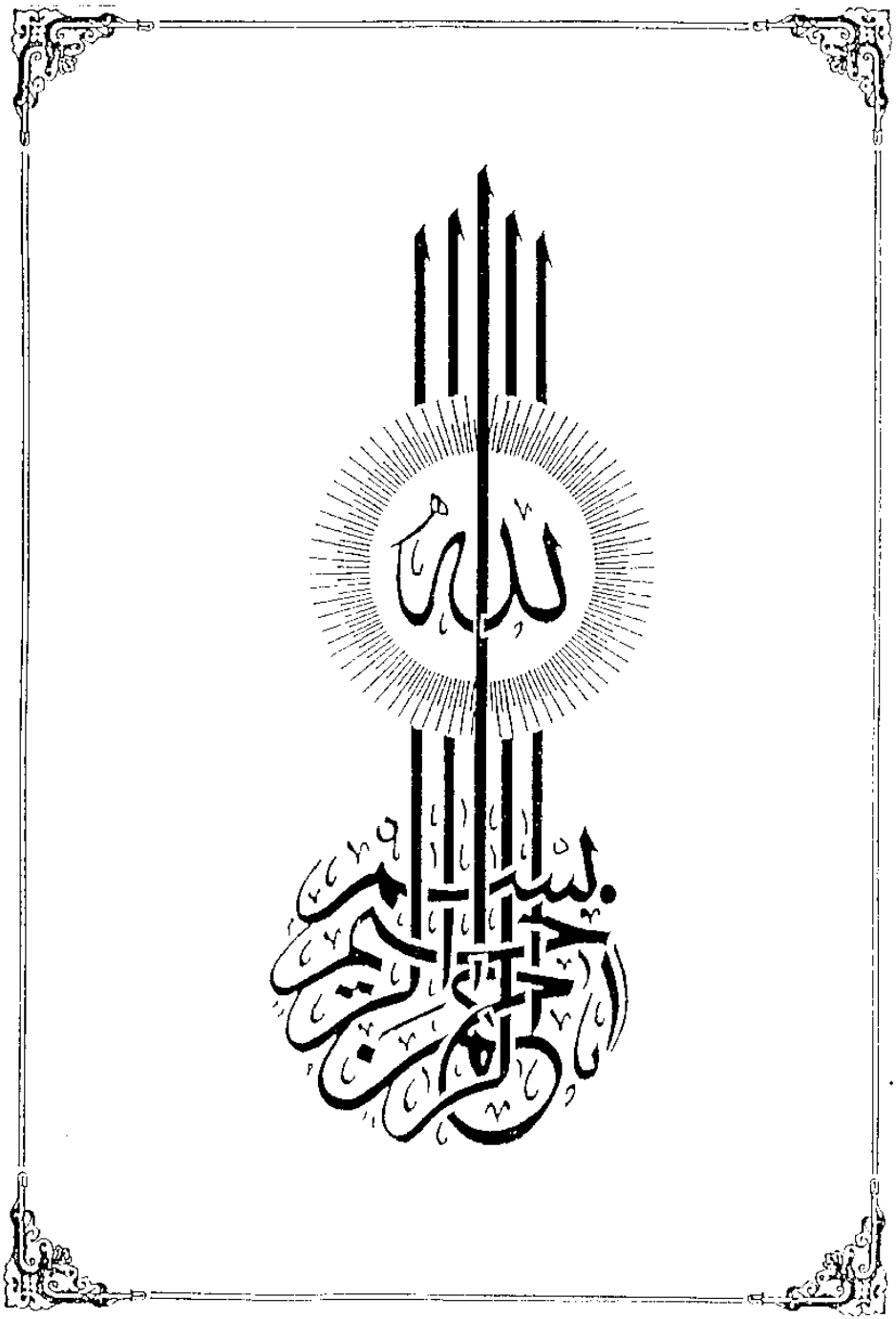

To

my

family

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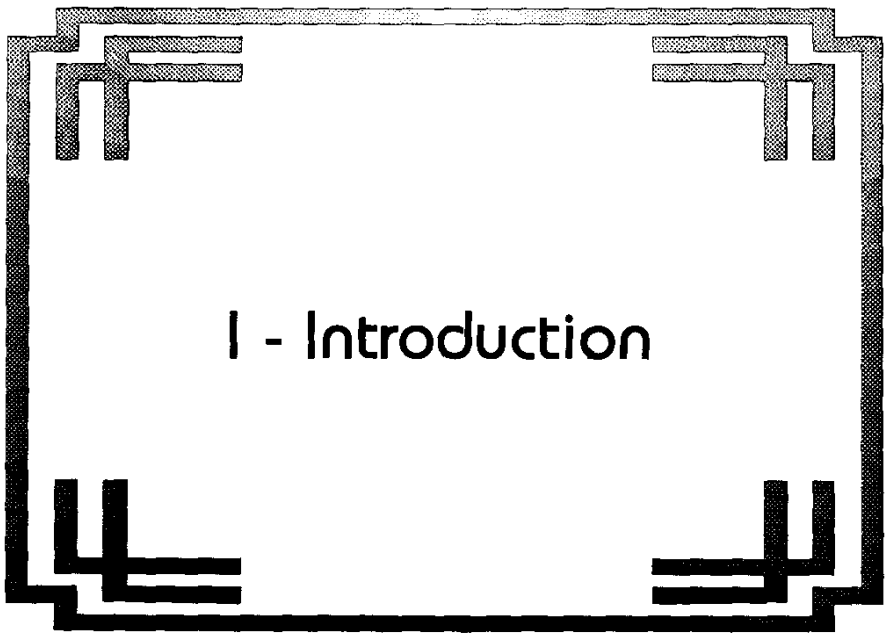
List of Abbrevations

AD	*: Since the Christ was born*
ALT	*: Argon laser trabeculoplasty.*
BC	*: Before christ was born.*
BRVO	*: Branch retinal vein occlusion.*
CRVO	*: Central retinal vein occlusion*
CNVM	*: Choroidal neovascular membrane*
CW	*: Continuous wave.*
DLT	*: Diode laser trabeculoplasty.*
Ga. Ai. As	*: Gallium. aluminum. arsenide.*
H_2O	*: water.*
ILM	*: Internal limiting membrane*
IOP	*: Intraocular pressure*
IV	*: Intra venous.*
nm	*: nano meter*
PAS	*: Peripheral anterior synechia.*
PDR	*: Proliferative diabetic retinopathy.*
POAG	*: Primary open angle glaucoma.*
PVR	*: Proliferative vitreoretinopathy.*
ROP	*: Retinitis of prematurity*
RPE	*: Retinal pigment epithelium*
SL	*: Slit lamp.*
um	*: micrometer*
W	*: Watt.*



1 - Introduction

Introduction

The historical aspects of ophthalmic lasers are fascinating and exciting. The eyes, because of its precise structure, has been the recipient of a large amount of the transfer of technology from the physical to the biological science.

The effects of solar radiations was well known to the ancient, as the first description of central scotoma following solar burn of the retina was reported by **Theophilus Bonetus** *(1620 - 1689) AD.*

Czerny, Deutcmmann *investigated the use of either sun or carbon arc to produce lesion in the retina.* **Maggior** *focused sun light on two enucleated eyes and then examined the eyes histologically.*

In 1940, **Moran Salas** *performed numerous experiments on human and rabbits eyes, to use light coagulation therapeutically and it was published in 1950.*

Concurrently **Meyer Schwickerath** *published his first experience with light photo coagulation in 1949.*

Between 1945 - 1956, beck arc was used as a photocoagulation source.

In 1965, the high pressure xenon lamp was used as a photocoagulation source and the xenon arc photocoagulation instrument pioneered by **Meyer Schwickerath,** *was made commerically by* **Ziess.**

"L'esperance'., 1989".

In 1960, **Maiman** *constructed the first working laser, using ruby crystal with a mono chromatic emission of red light "693.4 nm", and it was used to treat a number of retinal conditions but less successful in treating proliferative diabetic retinopathy "PDR".*

"Mchugh et al., 1988".

Mile Stone of Photo Coagulation	
400 BC	Plato recognized ocular damage by sun.
1640 AD	Bontus warns of eclips blindness.
1845	Atomic bomb blindness.
1946	Atomic bomb blindness research.
1948	Meyer-Schwickerath experiment
1956	Xenon- arc photocoagulation
1960	Advent of laser

Table I-I

" quoted from L'esperance F.A. Ophthalmic laser, St. louis, the C.V. Mosby Company, Vol. 1:14. 1989"

In 1968, **Aiello** *and coworkers described the use of the ruby laser in treating PDR. Difficulty in producing a full thickness retinal coagulation, and the risk of subretinal haemorrhage with ruby laser, attributed to the short pulse duration "2 milliseconds", and the emitted red wave length, helped to stimulate the development of continuous wave "CW" gas ion laser to be used in ophthalmology.*

"Mark and carmen., 1990"

The relative importance of wave length led to development of blue green CW argon laser photocoagulation by **L'esperance** *in 1986, which became commerically available in 1971 and was in wide spread clinical use by 1975.*

The early argon photocoagulator emitted more than 70% of their radiation in the blue "488 nm", which is close to the peak absorption of luteal pigments "460nm". Many early treatments of macular region using such system