The Evolution Of The Eye

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Introduction

Evolutionists claim [1] that the eye evolved from a simple single celled light sensitive patch into the modern eyes we see in complex multi cellular organisms we see today. If this was true we would expect so see that animals of a common descent have the same eye types and the distribution of eyes in nature lines up with the evolutionary tree of life. As far as identical types of very complex eyes arising independently would be impossible. Imagine two teams of engineers independently designing two very identical Chevrolet Corvettes or two very identical Microsoft Windows. The chances are far too remote to happen in trillions of years.

The Origin Of Light Reception

If we look at the table [2] below we see that light sensitivity arose independently in micro and macro organisms several different times. As far as a proving a single ancestor is the source is impossible. The evidence agrees with the creationist view of independent origins.

Table 1. Summary of photo pigments and stigma/eyespot structures in phototactic eukaryotes

Animal	Photo Pigment	Stigma/Eyespot	Independent Origin?
green algae	type I rhodopsin,	in the cyanobacterium-derived chloroplast	Yes
heterokonts	Flavoprotein, pterin	in the red alga-derived chloroplast or in the cytoplasm	Yes
haptophytes	?	in the red alga-derived chloroplast	?
cryptophytes	type I rhodopsin	in the red alga-derived chloroplast	Yes
ciliates	hypericin-like pigment þ protein	formed by cytoplasmic vesicles	Yes
dinoflagellates	(Rhodopsin?)	none, or in the cytoplasm, or in a diatom-derived, or vestigial chloroplast	?
euglenoids	light-activated adenylyl cyclase (PAC)	formed by vesicles close to the base of the cilia	Yes
Amoebozoa	? (not a rhodopsin)	none, direction sensing by lens effect	Yes
chytrid fungi	type II rhodopsin, origin unclear	formed by large cytoplasmic vesicle	Yes
animals	type II rhodopsin	pigment vesicles in the photoreceptor cell or a distinct pigment cell	Yes

The Distribution of Eyes in Nature

The distribution of eyes in nature should agree with the evolutionary tree of life. There are ten [3-6] major types of eyes in nature. In table 2 we can see eight types of eyes and how they are arranged in seventeen biological phylum/orders. We can see that many identical eye types exist in orders that have no evolutionary relationships. Many orders that supposedly arose from one ancestor have several different eye types. The chances of so many types evolving independently of each other so many times is zero.

Table 2. Phylogenetic distribution [3] of the eight major types of eye

Phylum	A	B	C	D	E	F	G	H
Cnidarians	A		C					
Flatworms	A							
Other Phyla	A							
Crustaceans	A		C		E		G	H
Annelid Worms	A		C		E			
Cephalopods	A		C					
Gastropods	A		C					
Bivalves	A	B					G	
Chordates	A							
Echinoderms	A							
Echinoderms		B						
Vertebrates			C					
Fish			C					
Insects				D	E			
Chelicerates						F		
Vertebrates				D				
Tetrapods				D				

(A) **Pit eyes;**
(B) **Basic compound eyes;**
(C) **Aquatic lens eyes;**
(D) **Corneal lens eyes;**
(E) **Apposition compound eyes;**
(F) **Refracting superposition compound eyes;**
(G) **Single chambered eyes, concave mirrors;**
(H) **Reflecting superposition eyes**

A more detailed analysis can be found in tables 3 and 4. Here we see all ten types of eyes in thirteen phyla. The first table is in eye order and the second table is in phylum order. There are many cases (Spherical Lenses, Corneal Refraction, Reflector, Apposition and Refracting Superposition) where unrelated groups of animals have the same eye types. Many phylum have more than one eye type like Annelids, Arachnids and Fish that have two eye types each. Mollusc have three eye types. Insects have four eye types and Crustaceans have six types. The probability of such highly complex identical eye types evolving independently and working perfectly is just simply zero.

Table 3. Phylogenetic distribution [4-6] of ten major types of eye in 13 Phyla/Groups

Eye Type Order	Distribution In Nature	Phylum
Pit Eyes	**28 of the 33 metazoan phyla**	**Many**
Pinhole Eyes	**Cephalopod mollusc**	**Mollusc**
Spherical Lenses	**Fish**	**Fish**
	Cephalopods: Ammonoidea, Coleoidea	**Mollusc**
	Gastropods: Strombids, Heteropods, Pulmonates	**Mollusc**
	Alciopid polychaetes	**Annelids**
	The copepod (Labidocera).	**Crustaceans**
Multiple Lenses	**Pontella, the lens is a triplet**	**Crustaceans**
	Copilia, eye has two lenses	**Crustaceans**
Corneal Refraction	**Arachnids**	**Arachnids**
	Amphibians	**Amphibians**
	Reptiles	**Reptiles**
	Birds	**Birds**
	Mammals	**Mammals**
Reflector Eyes	**Rotifers**	**Rotifers**
	Platyhelminthes	**Platyhelminthes**
	Copepod crustaceans	**Crustaceans**
	Barreleye fish	**Fish**
	Spookfish, Dolichopteryx longipes	**Fish**
Apposition Eyes	**Sea Spiders**	**Crustaceans**
	Arachnids	**Arachnids**
	Merostomata	**Crustaceans**
	Crustacea	**Crustaceans**
	Myriapods	**Myriapods**
	Insects	**Insects**
	Sabellid tube worm	**Annelids**
	Family Arcacae	**Mollusc**
Neural Superposition	**Dipteran flies**	**Insects**
Afocal Apposition	**Butterflies have apposition eyes**	**Insects**
Refracting Superposition	**Nocturnal insects**	**Insects**
	Shrimps	**Crustaceans**
	Lobsters	**Crustaceans**
	Crayfish	**Crustaceans**
Parabolic Superposition	**Swimming crab, anomuran hermit crabs**	**Crustaceans**

Table 4. Phylogenetic overlaps [4-6] of ten major types of eye in 13 Phyla/Groups

Eye Type	Distribution In Nature	Phylum Order
Corneal Refraction	Amphibians	Amphibians
Spherical Lenses	Alciopid polychaetes	Annelids
Apposition Eyes	Sabellid tube worm	Annelids
Corneal Refraction	Arachnids	Arachnids
Apposition Eyes	Arachnids	Arachnids
Corneal Refraction	Birds	Birds
Spherical Lenses	The copepod (Labidocera).	Crustaceans
Multiple Lenses	Pontella, Copilia	Crustaceans
Reflector Eyes	Copepod crustaceans	Crustaceans
Apposition Eyes	Crustacea, Sea Spiders, Merostomata	Crustaceans
Refracting Superposition	Shrimps, Lobsters, Crayfish	Crustaceans
Parabolic Superposition	Swimming crab, Hermit crabs	Crustaceans
Spherical Lenses	Fish	Fish
Reflector Eyes	Barreleye fish, Spookfish	Fish
Apposition Eyes	Insects	Insects
Neural Superposition	Dipteran flies	Insects
Afocal Apposition	Butterflies have apposition eyes	Insects
Refracting Superposition	Nocturnal insects	Insects
Corneal Refraction	Mammals	Mammals
Pinhole Eyes	Cephalopod mollusc	Mollusc
Spherical Lenses	Cephalopods, Gastropods	Mollusc
Apposition Eyes	Family Arcacae	Mollusc
Apposition Eyes	Myriapods	Myriapods
Reflector Eyes	Platyhelminthes	Platyhelminthes
Corneal Refraction	Reptiles	Reptiles
Reflector Eyes	Rotifers	Rotifers

Evolution Of Retinal Oil Droplets

The retinal cones in many vertebrate eyes [7] contain oil droplets which act as colour filters. Amphibians and mammals have two types. Fish and reptiles have three colour groups. Putting the arrangement into an evolutionary tree is impossible. Five different groups (Birds, Fish, Reptiles, Amphibians and Mammals) have oil droplets. Making these biological demographics line up with the standard tree of life is full of contradictions. According to evolution mammals descended from reptiles that descended from amphibians that descended from fish. If amphibians (droplets absent) descended from fish (transparent droplets) how did the droplets that disappeared in amphibians re appear in reptiles? Mammals (transparent droplets) were supposed to have descended from lizards (coloured droplets).

Fish	Transparent
Amphibians	Absent
All Reptiles	Transparent and Colored
Lizards	Colored
Mammals	Transparent

Table 5. Retina oil droplets [7] in vertebrates (Oil Droplets Order)

Group	Phylum	Oil Droplets Order
Caecilians, Salamanders	Amphibians	ABSENT
Newts	Amphibians	ABSENT
Sharks, Skates	Cartilaginous Fish	ABSENT
Rays, Chimaeras	Cartilaginous Fish	ABSENT
Teleosts, Gars	Fish	ABSENT
Bowfin, Lampreys, Hagfish	Fish	ABSENT
Placental Mammals	Mammals	ABSENT
Crocodiles, Snakes	Reptiles	ABSENT
Birds	Birds	COLORED
Lungfish	Fish	COLORED
Lizards, Turtles	Reptiles	COLORED
Frogs, Toads	Amphibians	TRANSPARENT
Coelacanth, Birchir	Fish	TRANSPARENT
Sturgeons, Paddlefish	Fish	TRANSPARENT
Marsupials, Monotremes	Mammals	TRANSPARENT
Tuatara	Reptiles	TRANSPARENT

Table 6. Retina oil droplets [7] in vertebrates (Phylum Order)

Group	Phylum Order	Retina Oil Droplets
Caecilians, Salamanders	Amphibians	ABSENT
Newts, Frogs, Toads	Amphibians	ABSENT
Birds	Birds	COLORED
Sharks, Skates	Cartilaginous Fish	ABSENT
Rays, Chimaeras	Cartilaginous Fish	ABSENT
Teleosts, Gars, Lungfish	Fish	ABSENT
Bowfin, Lampreys, Hagfish	Fish	ABSENT
Coelacanth, Birchir	Fish	TRANSPARENT
Sturgeons, Paddlefish	Fish	TRANSPARENT
Placental Mammals	Mammals	ABSENT
Marsupials, Monotremes	Mammals	TRANSPARENT
Crocodiles, Snakes	Reptiles	ABSENT
Lizards, Turtles	Reptiles	COLORED
Tuatara	Reptiles	TRANSPARENT

The Evolution of Crustacean Compound Eyes

Crustaceans are supposed to have descended from a primitive Cambrian ancestor like Trilobites or Lobopoda. They have at least five different lens structures among them. Thomas Cronin states that there eye evolution and general evolution remains a major problem: “The crustaceans pose a particularly difficult challenge in this regard, however, as there is so much morphological diversity that it is difficult to characterize crustaceans with any single set of features, and attempts at understanding their taxonomic groups and phylogenetic relationships based on morphology have been problematic for as long as they have been studied. Furthermore, molecular studies have shown that the Crustacea are not a unified group, but instead form several distinct lineages, some of which are more closely related to the insects than to other well-accepted crustacean lineages.” [8]

Cronin admits that simple eye arose independently many times in their evolution: “While it seems certain that simple eyes arose independently several times in crustacean evolution, little is known about the evolutionary paths taken to produce the very unusual assortment of simple eye designs present in modern crustaceans.” [9] This agrees well with the creationist view of different ‘kinds’ in the book of Genesis. The chance that all these eyes just arose by chance and work so well is zero. “The compound eyes we encounter today are so diverse that it is not yet possible to trace all the evolutionary paths they took to get to the present-day designs.” [10]

He concludes by admitting that all the issues are unsolved and will only be resolved way in the future: “Significantly, the phylogenetic relationships among crustaceans are still contentious, particularly in comparison with the evolutionary relationships that are well documented among most other modern animals. A thorough understanding of crustacean visual system evolution will become possible only with the establishment of a cohesive, well-supported crustacean phylogeny.” [11]

Table 7. Crustacean Lens [9] Arrangements

Families	A	B	C	D	E	F
Deapoda	A	B	C	D		
Euphausiacea			C			
Stomapoda	A					
Amphipoda	A					
Isopoda	A		C			
Mysida			C			
Leptostraca	A					
Ostracoda	A				E	F
Thoracica					E	
Copepoda					E	
Remipedia						F
Cephalocarida						F
Hexapoda	A		C			
Anostraca	A					
Notostraca	A					
Conchostraca	A					
Cladocera	A					F
Mystacocarida						F
Branchiura	A					

Apposition	A
Reflecting Super Position	B
Refracting Super Position	C
Parabolic Super Position	D
Simple Eye Only	E
No Adult Eyes	F

Polyphyletic Evolution of Photoreceptors in Molluscs

A recent article by Salvini-Plawen [12] shows that molluscs have a huge arrange of eyes. Table 8 lists five different classes of molluscs with twenty three completely different eye structures. Arranging them into one evolutionary tree would be impossible.

Table 8. Crustacean Lens Arrangements

Taxon Order	Sub Taxon	Photoreceptors	Eye Structure
Bivalvia	Pteriomorpha	cerebral/larval ocelli	rhabdomeric
Bivalvia	Arcoida	compound eyes at mantle edge	ciliary
Bivalvia	Arcoida	pigment-cup ocelli at mantle edge	rhabdomeric
Bivalvia	Limoidea	eyes at mantle edge	mixed
Bivalvia	Pectinoidea	eyes with two retinae at mantle edge	rhabdomeric
Bivalvia	Pectinoidea	eyes with two retinae at mantle edge	ciliary (distal)
Bivalvia	Pandoroidea	eyes with one or two retinae at siphons	both retinae ciliary
Bivalvia	Cardioidea	eyes at siphons	ciliary or mixed
Bivalvia	Myidae	phaosomes embedded in siphons	rhabdomeric
Caenogastropoda	Cerithidea	pallial eye	ciliary
Gastropoda	In general, adult	cerebral photoreceptors	rhabdomeric
Gastropoda	Heteropoda, adult	cerebral eyes	ciliary or mixed
Gastropoda	Anaspidea: Aplysia	abdominal neurons	diverticular
Gastropoda	Onchidiidae	dorsal eyes	ciliary
Gastropoda	Onchidiidae	lens cells of dorsal eyes	rhabdomeric
Gastropoda	telephanic veligers	cerebral photoreceptors	ciliary
Placophora	(larvae)	laterally innervated larval ocelli	mixed
Placophora	(larvae)	laterally innervated larval ocelli	mixed
Placophora	(adult)	aesthetes in general	rhabdomeric
Placophora	(adult)	Acanthochiton lateral aesthetes	ciliary
Placophora	(adult)	extrapigmental shell-eyes	rhabomeric
Placophora	(adult)	shell-eye marginal cells	ciliary
Siphonopoda	(cephalopods)	cerebral photoreceptors	rhabdomeric
Siphonopoda		photosensitive vesicles	rhabdomeric

Implications for Annelid Evolution

An article by Suschenko lists ten orders of annelids [13] with forty eye types. He discusses their evolution and tells that the whole story is unsolved. The massive array of fully functioning eyes in annelids is just more evidence for intelligent design instead of time and chance: “The evolution of photoreceptor cells and eyes in Metazoa is far from being resolved, although recent developmental and structural studies have provided strong evidence for a common origin of photoreceptor cells and existence of sister cell types already in early metazoans. These sister cell types are ciliary and rhabdomeric photoreceptor cells, depending on which part of each cell is involved in photoreception proper. However, a crucial point in eye evolution is how the enormous structural diversity of photoreceptor cells and visual systems developed, given the general molecular conservation of the photoreceptor cells. One example of this diversity can be observed in Annelida.” [14] He concludes his article by saying that: “Considering the different hypotheses on polychaete phylogeny up to three different evolutionary scenarios are conceivable.” [15]

A	Rhabdomeric photoreceptors	G	Pigment cell with lens-like structure
B	Bicellular pigmented inverese ocellus	H	Secreted lens
C	Unpigmented ocellus	I	Eye cup with cuticular pore
D	Multicellular everse ocellus	J	Corneal cells
E	Ciliary vesitges in rhabdomeric cell	K	Ciliary photoreceptors
F	Pigment in rhabdomeric cell		

Table 9. Annelids Sorted By Eye Type [13]

Taxon	Family	Species	Eye Type	Type No.
Terebellida	Flabelligeridae	Flabelliderma commensalis	A----------	1
Scolecida	Capitellidae	Capitella sp. 1 adult	A----------	1
Eunicida	Dorvilleidae	Ophryotrocha dimorphica	AB---------	2
Eunicida	Dorvilleidae	Ophryotrocha puerilis	AB---------	2
Phyllodocida	Phyllodocidae	Phyllodoce maculata larva	AB---------	2
Sabellida	Sabellidae	Chone ecaudata	AB---------	2
Protodrilida	Protodrilidae	Protodrilus sp.	AB---------	2
Scolecida	Capitellidae	Capitella sp. 1 larva	AB---------	2
Spionida	Spionidae	Scolelepis squamata	ABC--------	3
Spionida	Spionidae	Pygospio elegans juv. adult	ABCD-------	4
Scolecida	Arenicolidae	Arenicola marina juvenile	ABC-E-G----	5
Scolecida	Opheliidae	Armandia polyophthalma	ABC-E-G---K	6
Scolecida	Opheliidae	Polyophthalmus pictus	ABC-E-G---K	6
Scolecida	Opheliidae	Ophelia rathkei juvenile	ABC-E-G---K	6
Protodrilida	Saccocirridae	Saccocirrus krusadensis	ABC-E---I-K	7
Phyllodocida	Hesionidae	Microphthalmus listensis	ABC-E-----K	8
Scolecida	Opheliidae	Armandia brevis	ABC---G----	9
Phyllodocida	Hesionidae	Microphthalmus similis	ABC-------K	10
Phyllodocida	Nereididae	Platynereis dumerilii, larva	AB-DEFG-IJK	11
Phyllodocida	Nereididae	Platynereis dumerilii, adult	AB-DEFG--JK	12
Phyllodocida	Phyllodocidae	Phyllodoce mucosa larva	AB--E------	13
Sabellida	Sabellidae	Fabricia stellaris	AB--E------	13
Sabellida	Serpulidae	Spirobranchus giganteus larva	AB--E------	13
Sabellida	Serpulidae	Spirorbis spirorbis larva	AB--E------	13
Terebellida	Pectinariidae	Pectinaria koreni larva	AB--E------	13
Phyllodocida	Syllidae	Autolytus prolifer, larva	AB--E-GHIJ-	14
Sabellida	Serpulidae	Serpula vermicularis larva	AB--E---I--	15
Terebellida	Terebellidae	Lanice conchilega larva	AB--E---I--	15
Protodrilida	Saccocirridae	Saccocirrus sonomacus	AB--E---I--	15
Protodrilida	Saccocirridae	Saccocirrus papillocercus	AB--E---I-K	16
Dinophilida	Dinophilidae	Dinophilus gyrociliatus	AB----G----	17
Phyllodocida	Syllidae	Syllis amica larva	AB----G--J-	18
Phyllodocida	Polynoidae	Harmothoe imbricata larva	AB--------K	19
Polygordiidae	Polygordius	appendiculatus larva	AB--------K	19
Protodrilida	Protodrilidae	Protodrilus oculifer	AB--------K	19
Scolecida	Capitellidae	Heteromastus filiformis	A-C--------	20
Phyllodocida	Phyllodocidae	Eteone longa	A-CD-FG--JK	21
Phyllodocida	Nephtyidae	Nephtys caecoides	A-CD--G----	22
Phyllodocida	Nephtyidae	Nephtys caeca	A-CD--G----	22
Phyllodocida	Nephtyidae	Nephtys hombergii	A-CD--G----	22
Phyllodocida	Phyllodocidae	Phyllodoce mucosa	A-CD--GH-JK	23
Taxon	Family	Species	Eye Type	Type No.

Phyllodocida	Hesionidae	Microphthalmus carolinensis	A-C-------K	24
Phyllodocida	Hesionidae	Microphthalmus nahantensis	A-C-------K	24
Phyllodocida	Syllidae	Odontosyllis ctenostoma	A--DEFGHIJ-	25
Phyllodocida	Alciopidae	Vanadis tagensis	A--DEFGH-J-	26
Phyllodocida	Polynoidae	Arctonoe vittata	A--DEFGH-J-	26
Phyllodocida	Hesionidae	Ophiodromus pallidus	A--DEFG-IJ-	27
Phyllodocida	Hesionidae	Psamathe fusca	A--DEFG-IJ-	27
Phyllodocida	Hesionidae	Gyptis propinqua	A--DEFG-IJK	28
Phyllodocida	Nereididae	Nereis vexillosa	A--DEFG--J-	29
Phyllodocida	Syllidae	Autolytus pictus Stolo	A--DEF-HIJ-	30
Phyllodocida	Syllidae	Brania subterranea	A--DE-GH-J-	31
Phyllodocida	Nereididae	Nereis limnicola	A--DE-G--J-	32
Phyllodocida	Nereididae	Nereis virens	A--DE-G--J-	32
Phyllodocida	Syllidae	Syllis amica	A--DE-G--J-	32
Amphinomida	Amphinomidae	Eurythoe cf. complanata	A--DE---IJK	33
Eunicida	Eunicidae	Nematonereis unicornis	A--DE----J-	34
Phyllodocida	Nerillidae	Nerilla antennata	A--DE----J-	34
Amphinomida	Amphinomidae	Paramphimone sp.	A--DE----JK	35
Eunicida	Dorvilleidae	Protodorvillea kefersteini	A--DE----JK	35
Phyllodocida	Pisionidae	Pisione remota	A--DE----JK	35
Phyllodocida	Syllidae	Odontosyllis enopla	A--D-FGH-J-	36
Phyllodocida	Aphroditidae	Hermiona hystrix	A--D-FG-IJ-	37
Phyllodocida	Polynoidae	Acholoe squamosa	A--D-FG--J-	38
Phyllodocida	Polynoidae	Adyte pellucida	A--D-FG--J-	38
Phyllodocida	Polynoidae	Alentia gelatinosa	A--D-FG--J-	38
Phyllodocida	Polynoidae	Gattayana cirrosa	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe extenuata	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe glabra	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe impar	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe lunulata	A--D-FG--J-	38
Phyllodocida	Polynoidae	Lepidonotus squamatus	A--D-FG--J-	38
Phyllodocida	Polynoidae	Polynoe scolopendrina	A--D-FG--J-	38
Phyllodocida	Sigalionidae	Sigalion mathildae	A--D-FG--J-	38
Phyllodocida	Sigalionidae	Sthenalais boa	A--D-FG--J-	38
Phyllodocida	Syllidae	Spaerosyllis hystrix	A--D---H-J-	39
Polygordiidae	Polygordius	appendiculatus adult	A---------K	40

Table 10. Annelids Sorted By Taxon [13]

Taxon Order	Family	Species	Eye Type	Type No.
Amphinomida	Amphinomidae	Eurythoe cf. complanata	A--DE---IJK	33
Amphinomida	Amphinomidae	Paramphimone sp.	A--DE----JK	35
Dinophilida	Dinophilidae	Dinophilus gyrociliatus	AB----G----	17
Eunicida	Dorvilleidae	Ophryotrocha dimorphica	AB---------	2
Eunicida	Dorvilleidae	Ophryotrocha puerilis	AB---------	2
Eunicida	Eunicidae	Nematonereis unicornis	A--DE----J-	34
Eunicida	Dorvilleidae	Protodorvillea kefersteini	A--DE----JK	35
Phyllodocida	Phyllodocidae	Phyllodoce maculata larva	AB---------	2
Phyllodocida	Hesionidae	Microphthalmus listensis	ABC-E-----K	8
Phyllodocida	Hesionidae	Microphthalmus similis	ABC-------K	10
Phyllodocida	Nereididae	Platynereis dumerilii, larva	AB-DEFG-IJK	11
Phyllodocida	Nereididae	Platynereis dumerilii, adult	AB-DEFG--JK	12
Phyllodocida	Phyllodocidae	Phyllodoce mucosa larva	AB--E------	13
Phyllodocida	Syllidae	Autolytus prolifer, larva	AB--E-GHIJ-	14
Phyllodocida	Syllidae	Syllis amica larva	AB----G--J-	18
Phyllodocida	Polynoidae	Harmothoe imbricata larva	AB--------K	19
Phyllodocida	Phyllodocidae	Eteone longa	A-CD-FG--JK	21
Phyllodocida	Nephtyidae	Nephtys caecoides	A-CD--G----	22
Phyllodocida	Nephtyidae	Nephtys caeca	A-CD--G----	22
Phyllodocida	Nephtyidae	Nephtys hombergii	A-CD--G----	22
Phyllodocida	Phyllodocidae	Phyllodoce mucosa	A-CD--GH-JK	23
Phyllodocida	Hesionidae	Microphthalmus carolinensis	A-C-------K	24
Phyllodocida	Hesionidae	Microphthalmus nahantensis	A-C-------K	24
Phyllodocida	Syllidae	Odontosyllis ctenostoma	A--DEFGHIJ-	25
Phyllodocida	Alciopidae	Vanadis tagensis	A--DEFGH-J-	26
Phyllodocida	Polynoidae	Arctonoe vittata	A--DEFGH-J-	26
Phyllodocida	Hesionidae	Ophiodromus pallidus	A--DEFG-IJ-	27
Phyllodocida	Hesionidae	Psamathe fusca	A--DEFG-IJ-	27
Phyllodocida	Hesionidae	Gyptis propinqua	A--DEFG-IJK	28
Phyllodocida	Nereididae	Nereis vexillosa	A--DEFG--J-	29
Phyllodocida	Syllidae	Autolytus pictus Stolo	A--DEF-HIJ-	30
Phyllodocida	Syllidae	Brania subterranea	A--DE-GH-J-	31
Phyllodocida	Nereididae	Nereis limnicola	A--DE-G--J-	32
Phyllodocida	Nereididae	Nereis virens	A--DE-G--J-	32
Phyllodocida	Syllidae	Syllis amica	A--DE-G--J-	32
Phyllodocida	Nerillidae	Nerilla antennata	A--DE----J-	34
Phyllodocida	Pisionidae	Pisione remota	A--DE----JK	35
Phyllodocida	Syllidae	Odontosyllis enopla	A--D-FGH-J-	36
Phyllodocida	Aphroditidae	Hermiona hystrix	A--D-FG-IJ-	37
Phyllodocida	Polynoidae	Acholoe squamosa	A--D-FG--J-	38
Phyllodocida	Polynoidae	Adyte pellucida	A--D-FG--J-	38
Phyllodocida	Polynoidae	Alentia gelatinosa	A--D-FG--J-	38
Phyllodocida	Polynoidae	Gattayana cirrosa	A--D-FG--J-	38

Phyllodocida	Polynoidae	Harmothoe extenuata	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe glabra	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe impar	A--D-FG--J-	38
Phyllodocida	Polynoidae	Harmothoe lunulata	A--D-FG--J-	38
Phyllodocida	Polynoidae	Lepidonotus squamatus	A--D-FG--J-	38
Phyllodocida	Polynoidae	Polynoe scolopendrina	A--D-FG--J-	38
Phyllodocida	Sigalionidae	Sigalion mathildae	A--D-FG--J-	38
Phyllodocida	Sigalionidae	Sthenalais boa	A--D-FG--J-	38
Phyllodocida	Syllidae	Spaerosyllis hystrix	A--D---H-J-	39
Polygordiidae	Polygordius	appendiculatus larva	AB--------K	19
Polygordiidae	Polygordius	appendiculatus adult	A---------K	40
Protodrilida	Protodrilidae	Protodrilus sp.	AB---------	2
Protodrilida	Saccocirridae	Saccocirrus krusadensis	ABC-E---I-K	7
Protodrilida	Saccocirridae	Saccocirrus sonomacus	AB--E---I--	15
Protodrilida	Saccocirridae	Saccocirrus papillocercus	AB--E---I-K	16
Protodrilida	Protodrilidae	Protodrilus oculifer	AB--------K	19
Sabellida	Sabellidae	Chone ecaudata	AB---------	2
Sabellida	Sabellidae	Fabricia stellaris	AB--E------	13
Sabellida	Serpulidae	Spirobranchus giganteus larva	AB--E------	13
Sabellida	Serpulidae	Spirorbis spirorbis larva	AB--E------	13
Sabellida	Serpulidae	Serpula vermicularis larva	AB--E---I--	15
Scolecida	Capitellidae	Capitella sp. 1 adult	A----------	1
Scolecida	Capitellidae	Capitella sp. 1 larva	AB---------	2
Scolecida	Arenicolidae	Arenicola marina juvenile	ABC-E-G----	5
Scolecida	Opheliidae	Armandia polyophthalma	ABC-E-G---K	6
Scolecida	Opheliidae	Polyophthalmus pictus	ABC-E-G---K	6
Scolecida	Opheliidae	Ophelia rathkei juvenile	ABC-E-G---K	6
Scolecida	Opheliidae	Armandia brevis	ABC---G----	9
Scolecida	Capitellidae	Heteromastus filiformis	A-C--------	20
Spionida	Spionidae	Scolelepis squamata	ABC--------	3
Spionida	Spionidae	Pygospio elegans juv. adult	ABCD-------	4
Terebellida	Flabelligeridae	Flabelliderma commensalis	A----------	1
Terebellida	Pectinariidae	Pectinaria koreni larva	AB--E------	13
Terebellida	Terebellidae	Lanice conchilega larva	AB--E---I--	15

Table 11. Number of Annelids eye types per Taxon

Annelid Taxon	Number Of Eye Types
Amphinomida	2
Dinophilida	1
Eunicida	3
Phyllodocida	27
Polygordiidae	2
Protodrilida	5
Sabellida	3
Scolecida	6
Spionida	2
Terebellida	3

Visual Acuity In Insects

An article by Michael Land lists thirteen orders of insects [16] with five lens types. He concludes the article by saying that the evolution of insect eyes is still a mystery: "One of the intriguing unsolved problems of insect vision is why this design persisted when alternatives were apparently at hand, in the form of dorsal and larval ocelli, both of which have a single lens construction. Either there is something we still do not know about compound eyes, or evolution is remarkably conservative on some occasions." [17]

Table 12. Lens types in insect orders. [16]

Order	A	B	C	D	E
Coleoptera		B	C	D	
Collembola		B			
Dermaptera			C		
Dictyoptera		B			
Diptera			C		E
Ephemeroptera		B		D	
Hemiptera			C		
Hymenoptera		B			
Lepidoptera	A			D	
Neuroptera		B		D	
Odonata		B			
Orthoptera		B			
Phasmida		B			

Afocal Apposition	**A**
Apposition	**B**
Open Rhabdom	**C**
Optical Super Position	**D**
Super Position	**E**

Eye Evolution And Its Functional Basis

In 2013 Daniel Nilsson writes that the evolution of the eye happened so fast it left no record: "The phylogenetic relationship between the basic opsin-classes appears difficult to resolve and this may indicate that there was a rapid initial divergence, possibly reflecting a functional problem." [18] If there is no record than how do you know that it even happened? He concludes the article by saying that the origin of the eye is still a major difficulty and most eye evolution was completed before any fossils were formed.

"A major difficulty in reconstructing evolutionary events, especially those dating very far back in time, is that they must be based on correct phylogenetic relationships between animal taxa. Unfortunately, this is a persistent problem, especially concerning the position of key taxa such as placozoans, cnidarians, ctenophores, and acoel worms. Another limitation is that most of eye evolution was completed just before the first animal fossils were formed. The latter problem, however, also carries important information. The lack of fossils implies that the animals in which much of eye evolution took place were small and soft bodied." [19]

If we look at the diagram of eye types versus phylogeny [20] in his article we see many unsolvable problems. The five Phylum that have 'High Resolution Vision' cannot be arranged into an evolutionary tree of life. Many such discrepancies are obvious.

Table 13. The classes of photoreceptive tasks [20] plotted on a metazoan phylogeny (Phylum Order)

Super Phylum	Sub Phylum	Vision Types
Bilatera	Ctenophora	Non Directional Photoreception
Bilatera	Cnidaria	Low Resolution Vision
Deuterostomia	Acoela	Directional Photoreception
Deuterostomia	Hemichordata	Low Resolution Vision
Deuterostomia	Echinoderms	Low Resolution Vision
Deuterostomia	Cephalochordata	Low Resolution Vision
Deuterostomia	Tunicates	Low Resolution Vision
Deuterostomia	Vertebrates	High Resolution Vision
Lophotrochozoa	Platyhelminthes	Low Resolution Vision
Lophotrochozoa	Bryzoa	Directional Photoreception
Lophotrochozoa	Brachiopods	Directional Photoreception
Lophotrochozoa	Polyplacophora	Multi Directional Photoreception
Lophotrochozoa	Cephalapoda	High Resolution Vision
Lophotrochozoa	Gastropoda	Low Resolution Vision
Lophotrochozoa	Bivalves	Multi Directional Photoreception
Lophotrochozoa	Polychaeta Errantia	Low Resolution Vision
Lophotrochozoa	Polychaeta Sedentaria	Multi Directional Photoreception
Lophotrochozoa	Oligochaeta	Low Resolution Vision
Lophotrochozoa	Nemertea	Low Resolution Vision
Ecdysozoa	Tardigrada	Low Resolution Vision
Ecdysozoa	Onychopora	Low Resolution Vision
Ecdysozoa	Insects	High Resolution Vision
Ecdysozoa	Crustaceans	High Resolution Vision
Ecdysozoa	Chelicerata	High Resolution Vision
Ecdysozoa	Kinorhyncha	Low Resolution Vision
Ecdysozoa	Nematoda	Low Resolution Vision

Table 14. The classes of photoreceptive tasks [20] plotted on a metazoan phylogeny (Vision Order)

Super Phylum	Sub Phylum	Vision Types
Deuterostomia	Acoela	Directional Photoreception
Lophotrochozoa	Bryzoa	Directional Photoreception
Lophotrochozoa	Brachiopods	Directional Photoreception
Deuterostomia	Vertebrates	High Resolution Vision
Lophotrochozoa	Cephalapoda	High Resolution Vision
Ecdysozoa	Insects	High Resolution Vision
Ecdysozoa	Crustaceans	High Resolution Vision
Ecdysozoa	Chelicerata	High Resolution Vision
Bilatera	Cnidaria	Low Resolution Vision
Deuterostomia	Hemichordata	Low Resolution Vision
Deuterostomia	Echinoderms	Low Resolution Vision
Deuterostomia	Cephalochordata	Low Resolution Vision
Deuterostomia	Tunicates	Low Resolution Vision
Lophotrochozoa	Platyhelminthes	Low Resolution Vision
Lophotrochozoa	Gastropoda	Low Resolution Vision
Lophotrochozoa	Polychaeta Errantia	Low Resolution Vision
Lophotrochozoa	Oligochaeta	Low Resolution Vision
Lophotrochozoa	Nemertea	Low Resolution Vision
Ecdysozoa	Tardigrada	Low Resolution Vision
Ecdysozoa	Onychopora	Low Resolution Vision
Ecdysozoa	Kinorhyncha	Low Resolution Vision
Ecdysozoa	Nematoda	Low Resolution Vision
Lophotrochozoa	Polyplacophora	Multi Directional Photoreception
Lophotrochozoa	Bivalves	Multi Directional Photoreception
Lophotrochozoa	Polychaeta Sedentaria	Multi Directional Photoreception
Bilatera	Ctenophora	Non Directional Photoreception

Analysis Of Compound Eye Evolution

In an earlier article Daniel Nilsson writes that better confidence about the evolution of the compound eye has not arrived: “Our conclusions have far-reaching consequences, because they highlight fundamental ancestral differences between the ommatidia of crustaceans/insects on the one hand and those of chelicerates and myriapods on the other. If we are to avoid complicated theories where lenses evolve, disappear and evolve again, we have to conclude that focusing optics originated independently at least twice in arthropod ommatidia: as a crystalline cone in ancestral Crustacea and as corneal structures in ancestral chelicerates and myriapods. With only two possible alternatives - focusing by a cornea or a crystalline cone - the optical similarity between xiphosurid and myriapod ommatidia is not a strong indication that these two groups are phylogenetically closer to each other than either is to crustaceans and insects. Better confidence about the phylogenetic relationship between myriapods and chelicerates will be necessary before the full consequences of this reasoning can be assessed.” [21]

A **Corneal Lens**
B **Corneal Projection**
C **Focusing Cone**
D **Vitreous Cone**

Table 15. Location of focusing optics in the ommatidia of different arthropod groups

Phylum Order	Class	Eye Type
Insecta	Strepsiptera	A
Chelicerata	Xiphosura	AB
Myriapoda	Diplopoda	AB
Myriapoda	Lithobiomorpha	AB
Myriapoda	Scolopendromorpha	AB
Malacostracan Crustacea	Anaspidacea	AC
Malacostracan Crustacea	Mysidacea	AC
Malacostracan Crustacea	Euphausiacea	AC
Insecta	Neuroptera	AC
Insecta	Trichoptera	AC
Insecta	Lepidoptera	AC
Malacostracan Crustacea	Decapoda	ACD
Insecta	Ephemeroptera	ACD
Insecta	Coleoptera	ACD
Myriapoda	Scutigeromorpha	AD
Malacostracan Crustacea	Stomatopoda	AD
Malacostracan Crustacea	Tanaidacea	AD
Malacostracan Crustacea	Isopoda	AD
Insecta	Apterygota	AD
Insecta	Odonata	AD
Insecta	Plecoptera	AD
Insecta	Dictyoptera	AD
Insecta	Dermaptera	AD
Insecta	Hemiptera	AD
Insecta	Diptera	AD
Insecta	Hymenoptera	AD
Non-Malacostracan Crustacea	Anostraca	C
Non-Malacostracan Crustacea	Notostraca	C
Non-Malacostracan Crustacea	Conchostraca	C
Non-Malacostracan Crustacea	Branchiura	C
Malacostracan Crustacea	Amphipoda	C
Non-Malacostracan Crustacea	Cladocera	D
Non-Malacostracan Crustacea	Cirripedia	D
Non-Malacostracan Crustacea	Ostracoda	D

Table 16. Location of focusing optics in the ommatidia of different arthropod groups

Phylum Order	Class	Eye Type
Chelicerata	Xiphosura	AB
Myriapoda	Diplopoda	AB
Myriapoda	Lithobiomorpha	AB
Myriapoda	Scolopendromorpha	AB
Myriapoda	Scutigeromorpha	AD
Non-Malacostracan Crustacea	Anostraca	C
Non-Malacostracan Crustacea	Notostraca	C
Non-Malacostracan Crustacea	Conchostraca	C
Non-Malacostracan Crustacea	Cladocera	D
Non-Malacostracan Crustacea	Cirripedia	D
Non-Malacostracan Crustacea	Ostracoda	D
Non-Malacostracan Crustacea	Branchiura	C
Malacostracan Crustacea	Anaspidacea	AC
Malacostracan Crustacea	Stomatopoda	AD
Malacostracan Crustacea	Mysidacea	AC
Malacostracan Crustacea	Tanaidacea	AD
Malacostracan Crustacea	Isopoda	AD
Malacostracan Crustacea	Amphipoda	C
Malacostracan Crustacea	Euphausiacea	AC
Malacostracan Crustacea	Decapoda	ACD
Insecta	Apterygota	AD
Insecta	Odonata	AD
Insecta	Ephemeroptera	ACD
Insecta	Plecoptera	AD
Insecta	Dictyoptera	AD
Insecta	Dermaptera	AD
Insecta	Hemiptera	AD
Insecta	Neuroptera	AC
Insecta	Coleoptera	ACD
Insecta	Strepsiptera	A
Insecta	Diptera	AD
Insecta	Trichoptera	AC
Insecta	Lepidoptera	AC
Insecta	Hymenoptera	AD

Conclusion

Evolutionists admit that modern research has blurred how many times eyes have evolved: “Modern information derived from many lines of evidence, including comparative morphology, molecular biology, phylogenetics, and developmental biology, clearly shows that eyes are the product of a complex evolutionary history. At the same time, the combination of data from these divergent lines of inquiry has tended to blur rather than resolve the long-standing puzzle of how many times eyes have evolved.” [22]

There are so many eyes in nature and they all work so well which only shows that God made everything very good.

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