

SPECIAL PROJECT.

EXPRESSIONS OF
AGGRESSION

IN NATURE AND
MANMADE WORLD.

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EXPRESSIONS OF AGGRESSION IN NATURE AND MANMADE WORLD.

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I am also deeply indebted to Dr.Praful Seth of BNHS who permitted me to document required information.

(ARVIND.B.JOSHI)

IDC IIT Bombay.

APPROVAL SHEET

The special project entitled *EXPRESSION OF AGGRESSION IN NATURE AND MANMADE WORLD* by Arvind.B.Joshi 856108 under the guidance of Prof.A.G.Rao.is accepted towards the partial fulfillment of the requirements of the degree of Master of Design in Product Design.

GUIDE:

A handwritten signature in purple ink, appearing to read 'A.G. Rao', is written next to the 'GUIDE:' label.

INTERNAL EXAMINER

EXTERNAL EXAMINER:

CHAIRMAN:

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AGGRESSION : An Introduction

Aggression is not an easy concept to define although some cases are clear cut; single individuals or groups of humans may kill or injure other individuals, force others to do something against their will, or overtly thwart the expressed desire of other persons. Obviously threatening another person with death injury, or violence is also aggressive. Perhaps simply the conscious desire or INTENT to injure, kill coerce, thwart or threaten other human beings, even if these things are not actually carried out, could be considered aggressive. On a more subtle level, ridicule, sarcasm, hostile laughter and attempts to embarrass or demean others almost certainly has an aggressive component. What all these phenomena have in common is the intended or actual imposition of a person or groups' wishes on other people against their will.



Superficially aggression appears to be the antithesis of the co-operative aspect of humanity. However, paradoxically the

very forces that promote harmonious relations within a group are also often the basis of aggressive actions. He, it is important to make the distinction between individual and group aggression. The nature of aggressive behaviour, particularly the underlying motivating and emotional forces, may be enormously different in a one-on-one situation (a barroom brawl, a husband and wife fight) as opposed to tribal or national conflicts in discussing the biological bases of aggression; this fact is sometimes overlooked or not fully acknowledged.

Humans have the capacity to feel and identify the emotions of fear, anger, hatred, rage jealousy, greed and competitiveness and to exercise them sometimes as one individual against another. These emotions and the behavioural responses they promote are often adaptive, as Karmard Loven 2 has noted, assisting an individual in attempts to acquire and defend limited resources(wives, food, space, material wealth) is competition with others. In addition aggressive defence of relatives, especially children is a fundamental aspect of individual

aggression and a highly developed one.

Contrary to Lovenz it is hard to believe that the motivational bases for aggressive behaviour is exactly the same as those for feeding, drinking or copulating, In the latter, the probability of searching for an appropriate stimulus for a consummatory act increases over time, if an ' aggressive drive' were to be built up in a person, the likelihood would be that it would find in appropriate expression, with the individual unnecessarily alienating a friend or sustaining an injury in a fight. The ability to behave violently should be exercised only when selected situations arise and generally only as a last resort (However competitive behaviour, as opposed to violent behaviour , may have a motivational substrate more similar to that which controls feeding, drinking and copulation) Nevertheless the point is that humans often encounter opponents. The capacity to assert oneself aggressively is advantageous whether one faces this problem. Warfare unlike most individual acts of aggression is organised, premeditated and may involve individuals whose relation to the dispute that initiate the conflict is tenuous at best.

ANTIPREDATORY BEHAVIOR

CRYPTIC COLORATION
AND BEHAVIOR.

*Startle Displays.

*Distraction Displays.

*False Death Displays.

VIGILANT BEHAVIOR
FLOCKING,ALARMS.

ESCAPE BEHAVIOR.

Erratic movements & Mechanical,Chemical,
movement in a group.

REPELLANT BEHAVIOR. MIMICRY

AGGRESSION

ACTIVE

(Species is a dominant type)

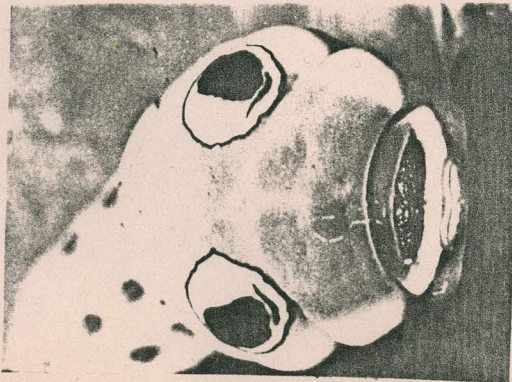
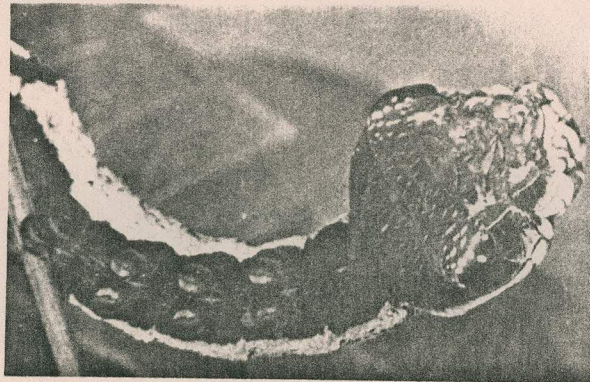
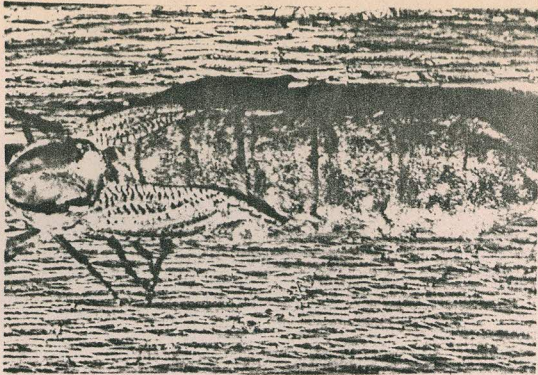
STRONG.

PASSIVE

(Inherently weak but outwardly
gives a sense of power which
tends to ward off predators.)

* Aggression mechanism is basically
a defensive one.

* Aimed at scaring away the predator
before a trial of strength.



B. PASSIVE AGGRESSION.

ANTIPREDATOR ADAPTATIONS:

1. CRYPTIC COLORATION AND BEHAVIOR.

*Prey resembles nonliving objects or common plants.

*Possible effect: Hides prey from the predator.
(Based on the predators capacity to habituate to or ignore neutral stimuli)

A. STARTLE DISPLAYS:

Exposure of hidden body stimuli.

*Surprises the enemy.

*Some predators have an innate fear of owl eyes and snakes, the prey have adaptations to remind the predator of its previous encounters with aforesaid animals, presence of marked and distracting eyes or appearance similar to snakes.

B. DISTRACTION DISPLAYS:

Movement of nonvital parts and injury feigning.

EFFECT: Causes the predator to misdirect its attack, based on the predators attraction to movement to small, dark, contrasting spots and to vulnerable prey.

2. VIGILANT BEHAVIOR; FLOCKING AND ALARM SIGNALS.

Effect: Detection of predator.

Based on the predators need to move, if
if it is too close within striking distance as well the predators ability to
learn IF DETECTED, ATTACK IS FUTILE!

3. ESCAPE BEHAVIOR, ERRATIC MOVEMENT AND MOVEMENT
IN A COMPACT CORED GROUP. (Strongest males
outside.)

POSSIBLE EFFECT: Evasion of the predator.

Based on the inability of the
of the predator to predict
unpredictable movement and ability
to get confused.

4. REPELLANT BEHAVIOR:

Mechanical, chemical, group defence behavior
warning signals, warning behavior.

EFFECT: The death, injury, or departure and some
times education of the predator.

5. MIMICRY.

EFFECT: Deception of the predator.

C. CRITICAL REACTION:

Even the most docile and timid animal can turn ferociously aggressive when it is pushed too far to the wall (and it has no other alternative but to fight, Do or Die type of situations). This is a very dangerous state in which the animal (trapped or cornered) fights to kill, commonly seen in a bitch defending her pups, wrens defending their chicks from hawks and other predatory birds.

ANTIPREDATORY DEFENSIVE MECHANISMS

This basically involves

1. Hiding from the predators
2. Detecting the predators first
3. Evading
4. Repelling predators

1. CRYPTIC BEHAVIOUR AND COLORATIONS

The hiders exploit the fact that predators tend to be extremely sensitive to movement and generally locate their prey by clues, often visual ones, by deceptive form and colors they force their enemies to invest more time and energy in locating them, they enabling them to live longer and reproduce.

The camouflage is aided by the inherent capacity to remain motionless/immobile for prolonged periods. Thus countless creatures exist which resemble and often behave like a leaf, a blade of grass, bark of tree, patch of dirt, gravel, sand, coral etc.

Many defenceless creatures grow and reproduce by mimicking common inedible objects.

Some months have stripes on their wings that resemble the grooves in the bark, the orientation too aids in the camouflage. While others those who can't match their environment themselves make their own environment inconspicuous and dull, eg. spreading of debris and others half eaten animals especially in spiders, which prevents their detection by birds, lizards etc. Paradoxically it is possible to hide from one's predators even when ones color pattern is conspicuous, for example various caterpillars and other insects and larvae, mimic bird droppings, they are highly visible but are probably usually ignored by birds because of their humble disguise as an inedible object.

Color patterns can be made more effective by behaviour, disruptively patterned three frogs. When resting during the day, pull their legs close to their body and lower their head, to resemble the lump formations on the barks of trees.

Hiders do not often do not succumb quietly but often rely on one or more 'backup strategy designed to reduce the possibility of capture if they have been detected, most common of this involves flying off

(moths, cryptic birds), dashing off (cockroaches, rabbits, lizards), dropping into the thick underbush and freezing (spiders, cryptic insects), retreating into a borrow or a shell. (rodents, millipedes, mollusks, turtles, armadillos).

A) SURPRISING A PREDATOR

Many camouflaged animals like grass snakes, quail, whip poor wills, remain hidden until the last possible moment and then dash away or fly off just as the predator is about to find them, this mainly serves them to obtain a head start over the startled predator for example the hognosed snake for example remains immobile until very closely observed, at which time it suddenly jerks and hisses loudly.

Insects have evolved various ways to startle or confuse a predator, some months when disturbed (as by a bird's tentative peek) it will begin a dramatic display, flapping their wings, about and rocking from side to side, the thought is that the bird might be taken a back by this unexpected transformation of a moth into

a whirling dervish, while the confused bird hesitates the moth is actually warming up its flight muscles and may succeed in escaping before the bird can react/recover. While other moths have cryptic forewings over brightly colored hind wings, when alarmed the front wings flip up () exposing

two large startling eyes, the sudden change in moth's appearance might persuade some predators to hesitate in attacking (as has been experimentally proved. ref Function of eye spot pattern in the Lepidoptera - Blest A.D.) these vital seconds often serve in avoiding fatality.

It has been suggested that the moth's eyes' mimic those of owls and the insecti birds, major enemies of the moth, may have innate feat of these stimuli, owls being their predators.

The larvae of several large moths have evolved the capability to transform themselves, in a still more amazing fashion. While feeding they are merely ordinary, if large (2-6 inches long) green and brown caterpillars, however when

touched, one suddenly becomes a snake, this involves expansion of the anterior end of the larva, forming a triangular head complete with snake eyes, moreover the 'snake' will strike accurately at objects that touch it, this not only gains the apprehensive attention of the would be predator and also exploits the probable innate fear of snakes, great enemies of birds.

B) MISDIRECTING A PREDATOR

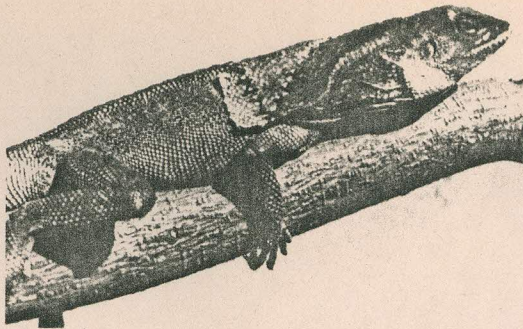
The major intention is to orient a predatory attack away from the vital areas. Hundres of fish and insects posses dark spots on places away from the eyes and head predators may have a general tendency to attack the heads of their victims, guided by the dark contrasting eyes, if successful if fatially wounds a prey, this tendency is exploited by edible animals which mimic large eyes on expandable parts of their bodies, these marks may divert the a attacker from critical areas of the body. Some butterflies and moths even go to the extent of having completely false heads designed to orient a predato is attack from the real thing.

The use of a moving part as a deflection lure is employed by any number of lizards and snakes, which twitch,their tails, when threatened by a predator, distracting the predators from their heads. Generally these appendages have a tragile connection to their body (tailsetc.) which often detaches; (As a finale the detached tail may thrash widely on the ground keeping the predators attentions while the lizard escapes. Some birds have evolved distraction display to lure away a predator from vulnerable offspring. Some birds, especially ground nesting specis have remarkably realistic 'broken wing' displays in which the bird staggers away from the nest, drawing the hunter after it. After moving some distance from the nest, the bird suddenly recovers and flies off, leaving a frustrated dog or fox behind.

C) PLAYING DEAD

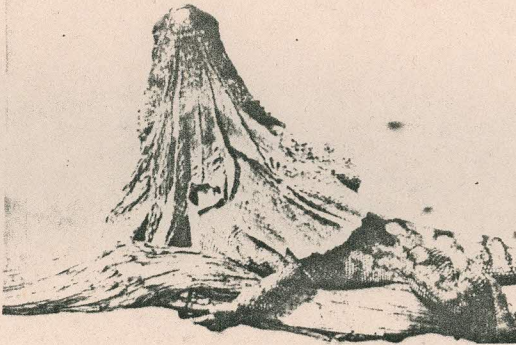
A large number of predators that feed only on freshly caught prey will attempt to capture and kill, only animals that move, hence many a prey feign a perfect 'death', this factic is often a third line of

defense for a cryptic species whose attempt to startle, misdirect or repel an attacker has failed. If the hissing of a hog nosed snake does not get away his predator his death play by exposing its white belly scales generally does.

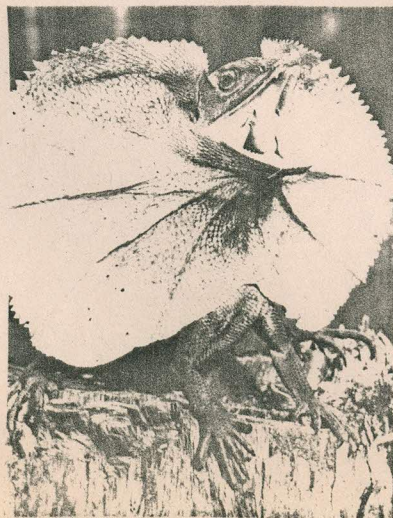


Stages in passive or acquired aggression :

The Australian tree lizard has body texture and mannerisms which go with the host tree trunk. It is a docile creature, which thrives on small insects.



Whenever a predator is sensed the head is raised the folds around the neck become prominently apparent, the skin texture becomes more coarse, it takes a steady perch and starts to survey around for an immediate.



Final stage of aggression:

The lizard is in full fury, the head is raised, mouth wide open exposing a set of curved fangs, the folds around the neck open up like an umbrella, serving dual purposes.

- i. Making the animal appear more bigger and more fearsome than it normally is.
- ii. The opened umbrella serves as a protective shield, successfully protecting vital organs.

CHARACTERISTICS OF AGGRESSION.

1. Raised head, fully opened eyes. (Preferably a change in color).
2. Heavy breath, inflated nostrils.
3. Steady perch or repetitive threats (usually mock aggression to gain non violent ascendancy).
4. Attempt to make themselves more powerful than they are by external transformations.
5. Baring of fangs, canines.
6. Deep and loud sounds.
7. Digging soil, making threatening postures.
8. Change of colour
9. Raised in - poised - especially serpents
10. Raising of facial and manal hair
11. Baring of claws.

HUMAN TENDENCIES.

1. Stare - Fixed with wide open eyes.
2. Verbal exchange
3. Holding of each other by the collar. Pulling close to see
4. each other in the eye.
4. Final verbal exchange - Few but forceful words.
5. Assault - Vital blows/defence
6. One of them gets over powered
- A Pause
7. Victor leaves - finishes off the loser.

PASSIVE AGGRESSION - defence mechanism characteristics

1. Brilliant colours - butterfly
2. Smell
3. Misleading colors which give an aggressive look
4. Presence of horns or spines on the head and tail.
5. Appearance of many eyes and 2 or more heads.

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AGGRESSIVE CHARACTERISTICS

Raised and taut fins.....a sign of dominance.
Long mouth filled with fang like teeth which curve
-inwards.

Overall shiny and metallic look
further accentuated by
mean looking beady
eyes.

Sharp and pointed
front, prominent
nostrils.

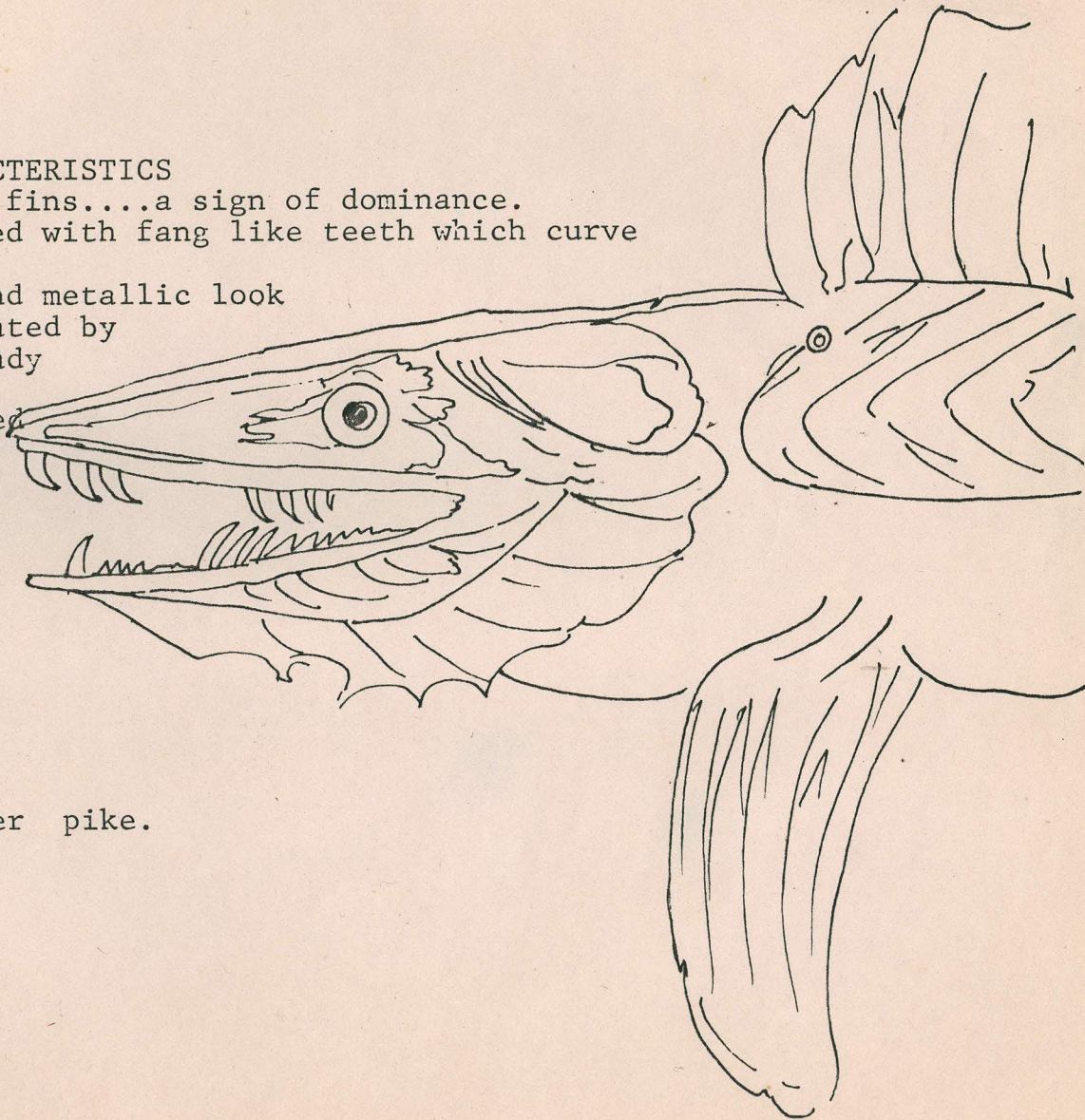
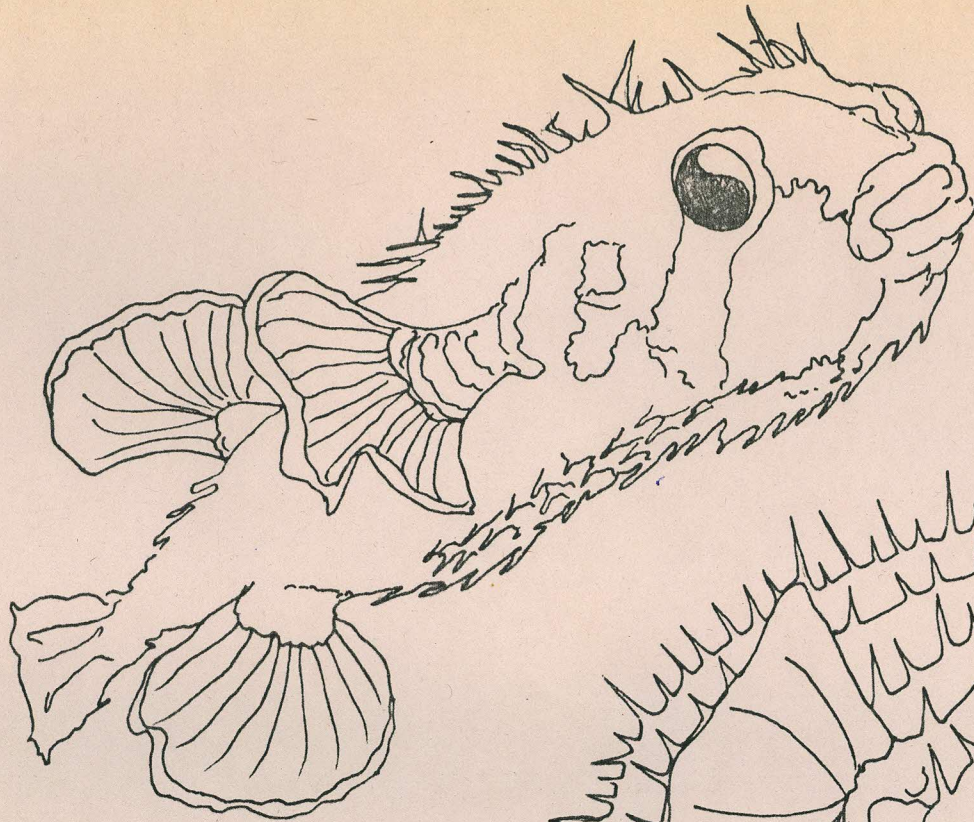
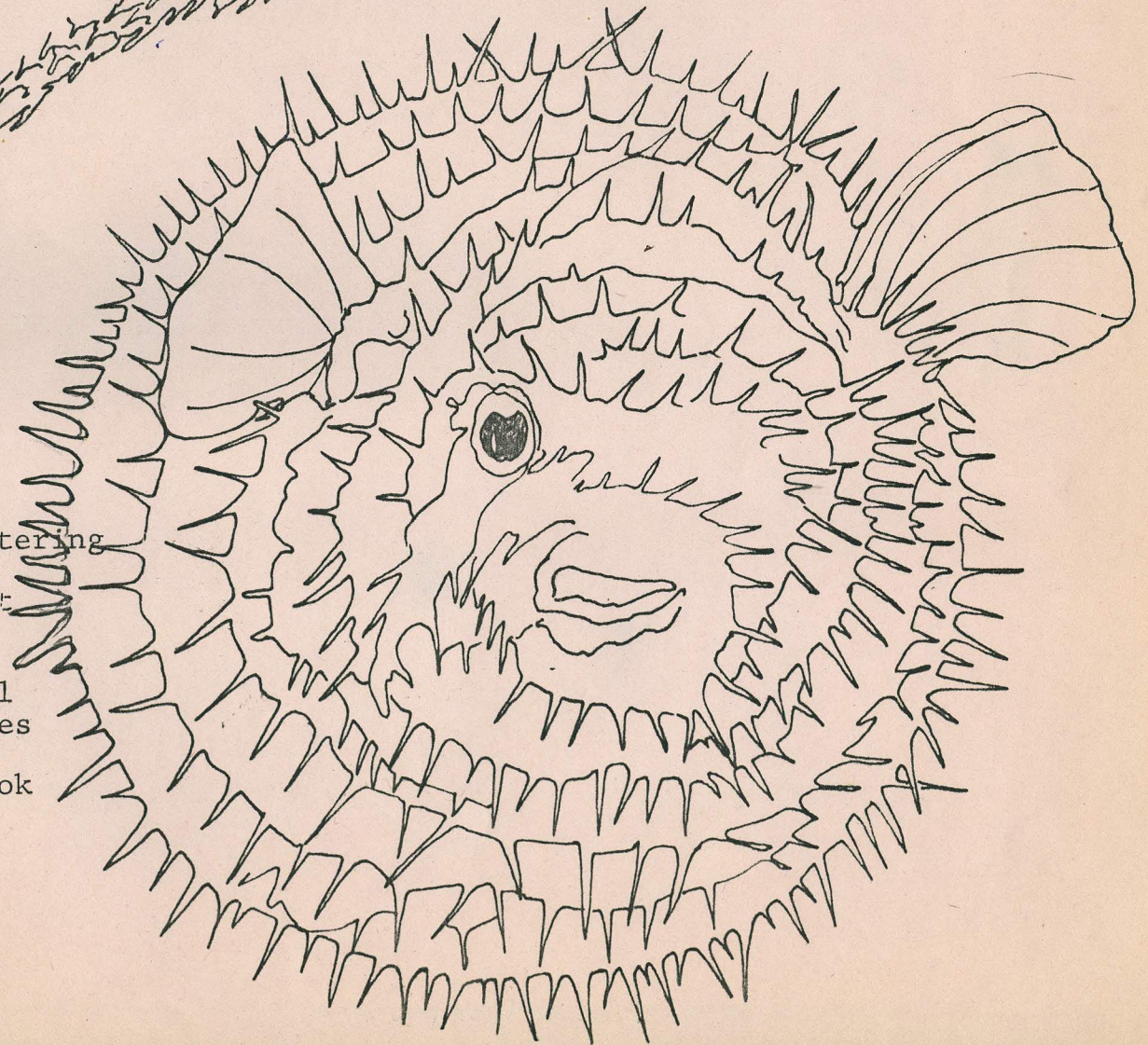


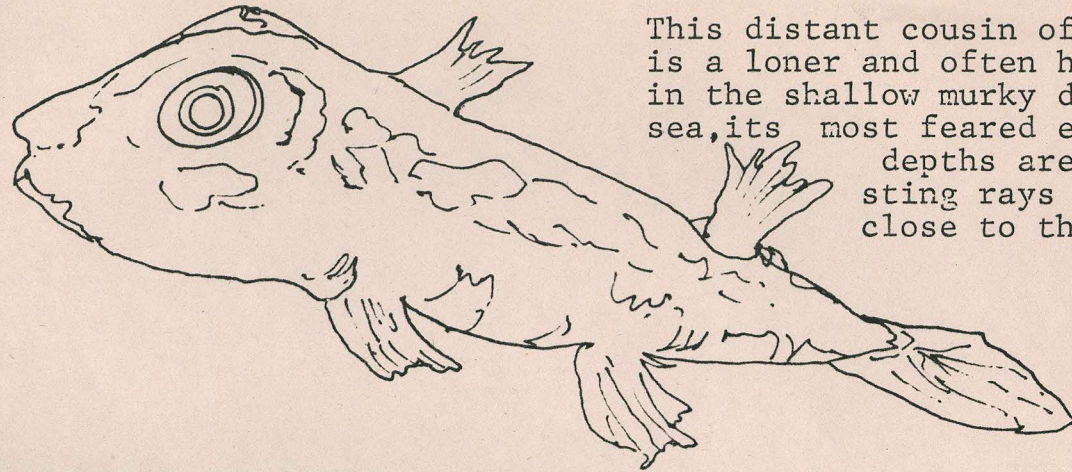
Fig..Common river pike.



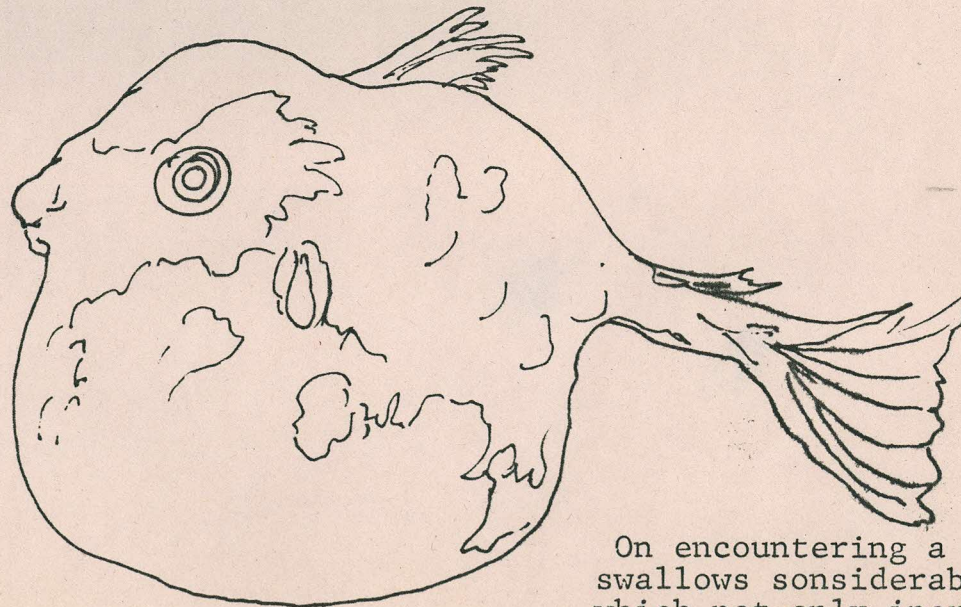
Normal state: A slender and meek looking animal, lazily looking around for food, the features in this state are plastic and translucent

Excited state: After encountering a predator the nomad fish swallows considerable amount of water and swells up, making it look atleast 5-6 times larger than its actual size. The sharp looking scales stand up and within minutes a timid animal starts to look threatening and menacing.



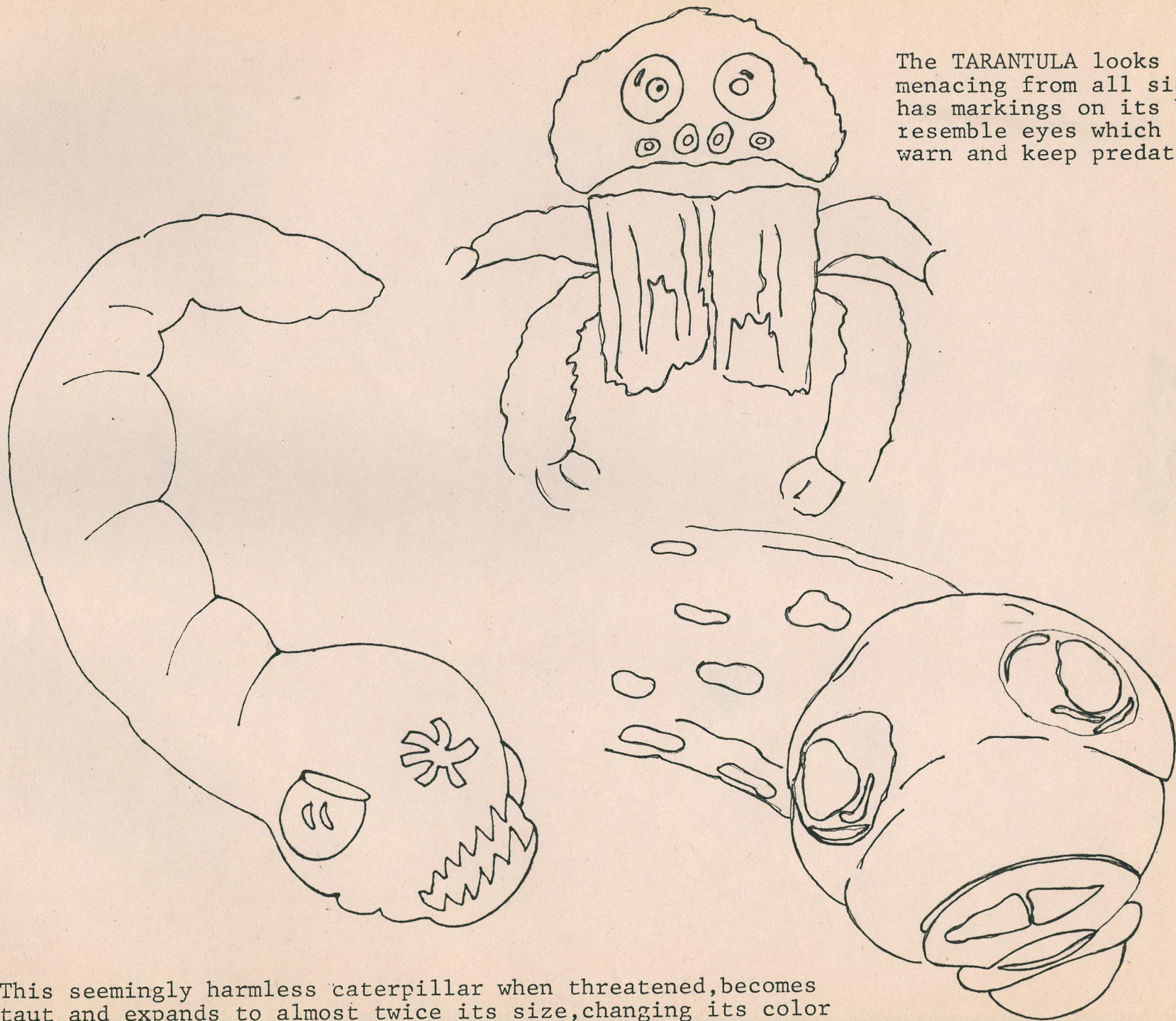


This distant cousin of the cow fish is a loner and often hunts its food in the shallow murky depths of the sea, its most feared enemy in those depths are lobsters and sting rays which stay very close to the sea bed.

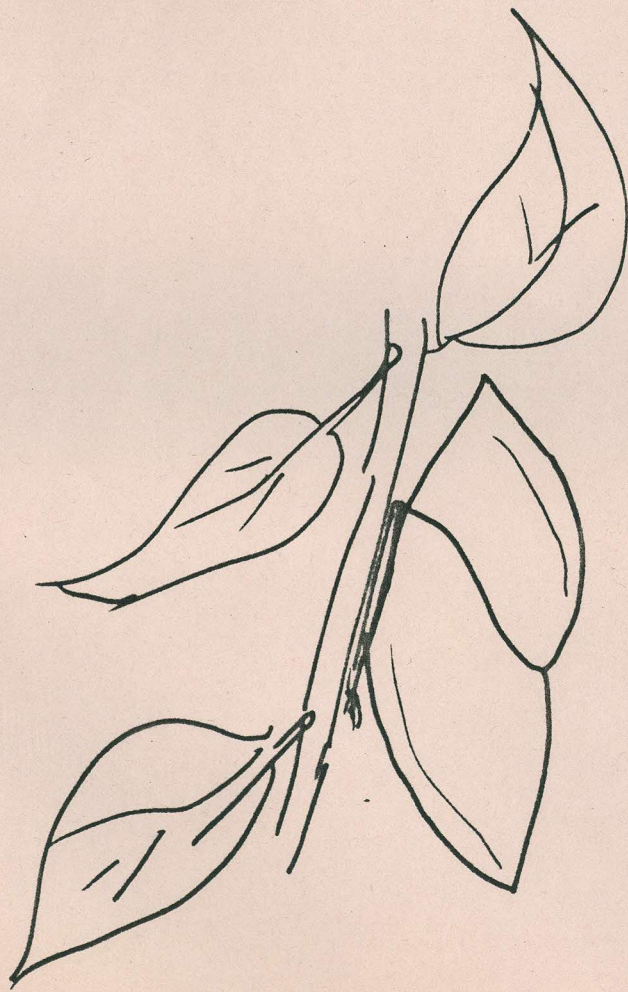


On encountering a predator this fish swallows considerable amount of water which not only increases its size but also aids in increasing the bouyancy which enables the fish to float out of dangers way.

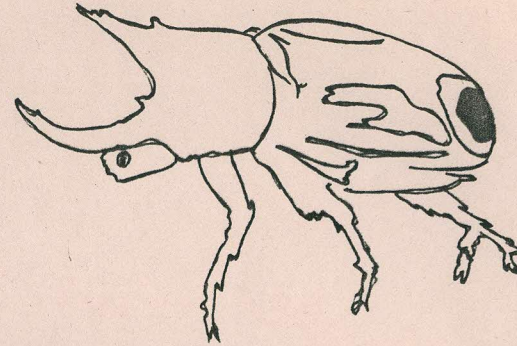
The TARANTULA looks equally menacing from all sides, it has markings on its body which resemble eyes which serves to warn and keep predators away.



This seemingly harmless caterpillar when threatened, becomes taut and expands to almost twice its size, changing its color from green to brown and yellow, the anterior part swells up to a triangular shape eye markings become very prominent, a menacing tooth-like projection develops which resembles a hungry mouth furthermore it has an



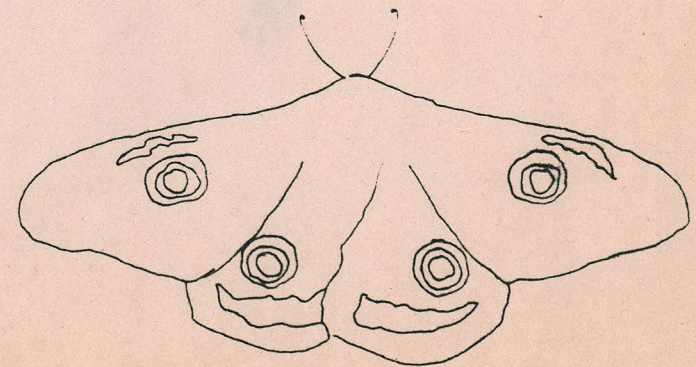
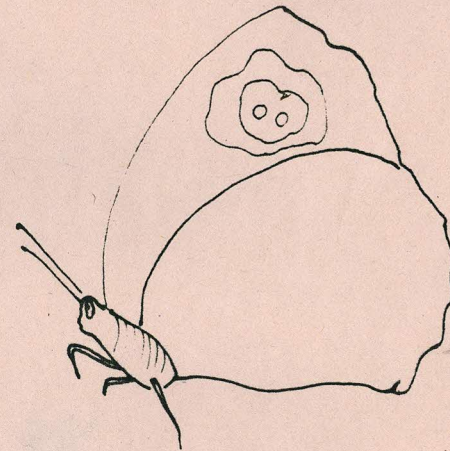
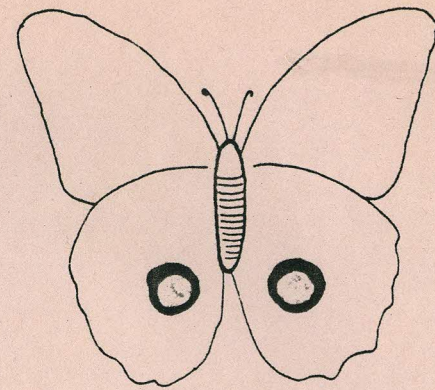
Some butterflies outsmart their predators by mimicing common inedible things like leaves, this butterfly with its leaf green colored camouflage orients itself along the leaves and



The horned beetle whenever threatened develops an eye like projection which has a hypnotic character, furthermore it takes a crouching position resembling a miniature rhino, after a while it starts making repetitive forward and backward movements



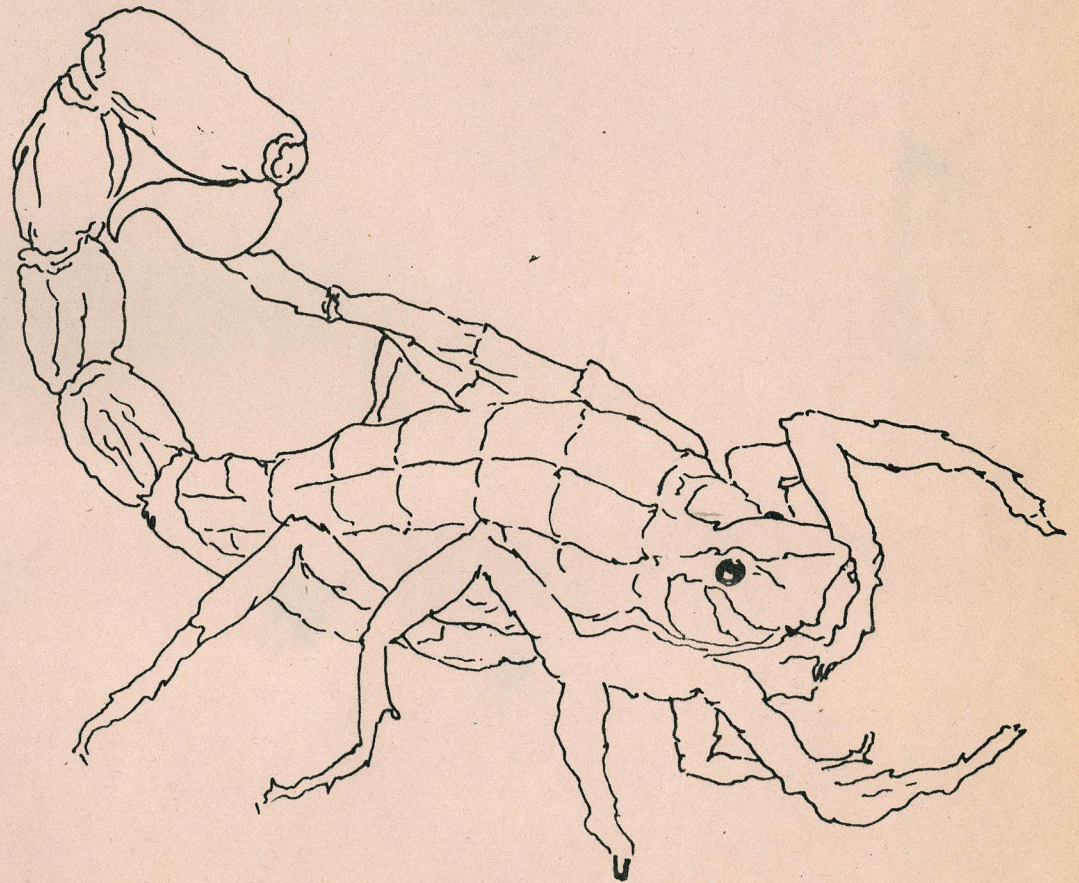
The Australian mountain devil is a serpent which is only marginally bigger than a garden lizard but when threatened spiny outgrowths take place from the body, covering the entire body with warts and spines which discourages the predator from attacking it.



Many animals survive because the contrast markedly from the surroundings by having very prominent eye like



Some creatures successfully ward off predators by their looks, the skeleton fish successfully wards off predators due to its bony jaws, large bulbous and



A typical aggressive posture adopted by a scorpion, a crouched stance, opened mandibles and a threateningly poised tail raised to strike.

luminiscent eyes which serve to induce a feeling of frigth.

AGGRESSION IN THE PLANT WORLD.

Plants generally fall under the category of 'PASSIVE AGGRESSION'; the outer skin of the plants and the patterns on the leaves can ward off grazing animals.

The highlights of this category are:

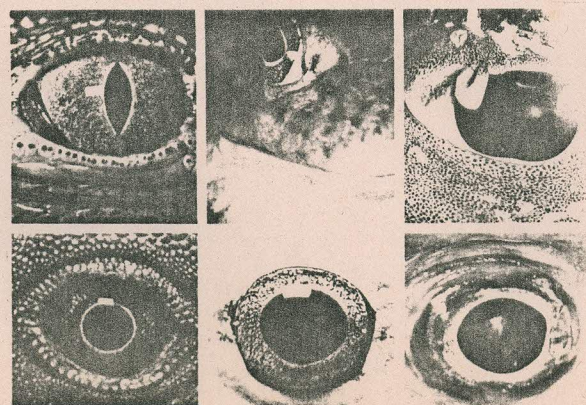
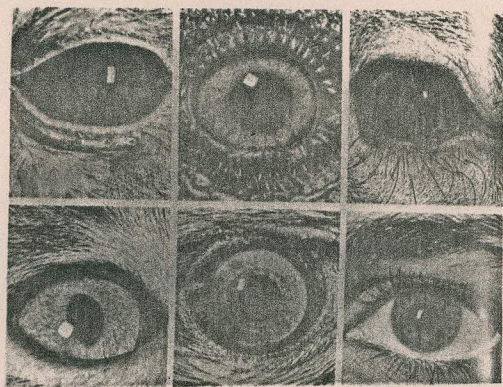
- *Bright colors.

- *Eye like patterns on the leaves.

- *Deceptively long and flat leaves and patterns

- *Strong odour on crushing.

- *Thorns and other spiny protrusions.



AGGRESSION AND EYES.

Eyes are the most important and dominant means to express aggression.

the important parameters being:

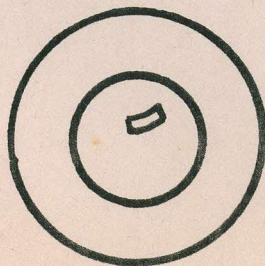
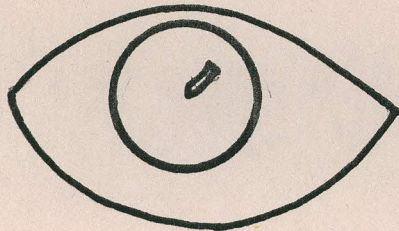
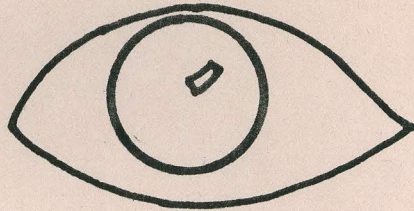
- * Shape and color of the pupil.
- * Amount of white mass and its definition.
- * Overall shape of the eye, (Round, oval, sharply tapered at both ends.

OBSERVATIONS FROM THE ANALYSIS OF EYES.

- * As the amount of white mass reduces, a feeling of evilness increases.
- * Colors other than black and white increase aggressiveness.
- * Non circular (Especially vertically biased) pupils give an eerie feeling.
- * Circular eyes, colored surroundings impart a feeling of constant stare, ie concentric eyes appear hypnotic.

MANIFESTATION OF ANGER:

- * the eyes are opened as wide as wide possible, ie to approach circularity.
- * Frown of eye brows and tending to bring them closer.



SCOPE OF THE PROJECT.

Though aggression in nature and its expression is a vast topic, but due to time and materialistic constraints only typical examples are cited here, the emphasis being laid on the mechanism of aggressive behavior.

This work assumes importance from the fact that it gives a lucid and visual understanding of aggression which can be incorporated in to product design. Significance of fangs, canines and their orientation could be exploited with dexterity to achieve desired effects in the design of grilles, ribs, for automobiles, air conditioners audio equipment etc. A separate chapter on 'Eyes And Aggression' will prove to of immense worth especially in the design of head lights and treatment of circular or symmetric objects, extendable to color combinations.

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