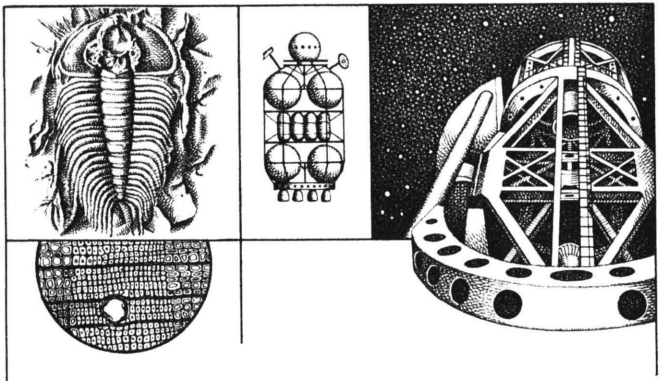
Galaxy
SCIENCE FICTION

AUGUST 1955

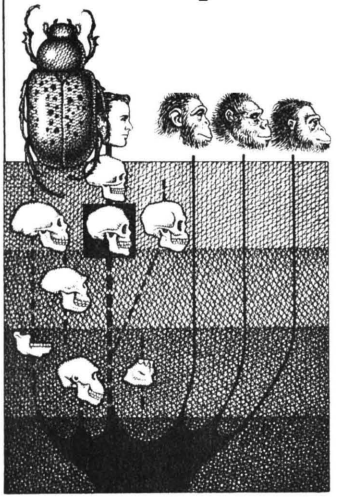
35c

THE FLAT-EYED MONSTER
By WILLIAM TENN

ANC



for your information



By WILLY LEY

THE NOT QUITE PERENNIAL PHYLLOPOD

I CAN'T make up my mind whether I should begin by telling you what you might be able to see this summer after a rainstorm has finally ended a dry spell or whether I should be more systematic and first pin down what it is I am going to talk about. Maybe the latter will be the better way because, after finding out what I am going to discuss, you may decide that you won't have to investigate rain puddles after reading about it.

Zoologists, you may know, divide all living things that are not vegetables into a number of major groups which they call phyla. Everything that has a backbone makes such a phylum, for example; all mollusks make a phylum and all one-celled animals make a phylum. One of these phyla bears the name of arthropoda.

The next smaller sub-division inside a phylum is the "class" and what kind of animals compose the phylum arthropoda will become clear quickly if I mention a few of the classes comprising it.

The insects are one of these classes and the arachnids (spiders and their relatives) are another one. The centipedes form another class and the crustaceans still another.

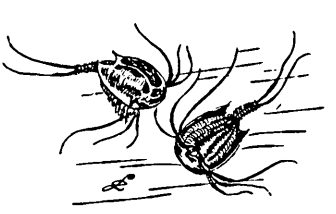
INSIDE a class, you have subclasses. In the case of the crustaceans, there are two which, by sheer coincidence, might be described as small crustaceans and large crustaceans; actually it is the presence or absence of abdominal appendages that counts. The ones without also happen to be minute, tiny or small in size and this subclass is called *Entomostraca.*

Inside the subclasses, you have "orders" and the one that interests us here is the order of the *Branchiopoda* which, if you insist on a translation, means "the gill-footed ones."

Inside the orders, you have sub-orders and the one I have in mind is called the sub-order of the *Phyllopoda* (*phyllodes* is Greek for "leaflike") and inside the sub-order you have, in this case, "divisions," of which the first is, at least, something fish fanciers among my readers should know by name — the division of the fairy shrimps. The division, in turn, is composed of "families" — the families of genera and the genera of species. The family is that of the *Apopidae* and the two families are *Lepidurus* and *Apus.*

It is *Apus* I want to tell about.

In appearance, it can best be compared to the well-known horseshoe crab of eastern North America. If you imagine a small horseshoe crab with a carapace about an inch in length, you also have a picture of the proper size. But Apus is much prettier.



Apus cancriformis, a crustacean in good standing but of irresponsible habits

Like all the so-called fairy shrimps, it has a strong tendency to be transparent, but it runs to definite colors in spite of that. The wide, flat carapace is somewhere between amber yellow and pale gold, the body is reddish, the legs brownish and the tail is red. It is bigger than most of the other fairy shrimps and the result is that the other fairy shrimps constitute its food.

Apus cannot be called rare, for when it occurs, there are hundreds of them in any large puddle over an area of square miles. But one can never predict whether it will occur or not. In England it was observed, for example, in 1850. The next occurrence there — southern Scotland, to be precise — took place in 1907. And it hasn't been reported from Great Britain since.

It is because of these ultra-sporadic occurrences that many a naturalist who knows all about Apus has never seen one in the open. You can't go and look for Apus, or rather you can look, as I said before, when a rainstorm has ended a summer dry spell, but whether you find one is a case of rare luck.

CONSIDERING its habit of "rare abundance," Apus must have made its existence known quite some time ago, but it did not get into print until around 1725. A gentleman by the name of Johann Leonhard Frisch then published a series of quarto volumes under the general title of *Description of manyfold Insects* and in one of these volumes Apus appeared — with the name that is still in use.

Translated, the word Apus means "footless," which sounds slightly unbelievable when you look at the picture. But Frisch had a reason — he did not consider the many appendages of the Apus as feet. He was somewhat vague as to what they were, but he was sure that they were not feet and coined the name accordingly.

The next man to deal with Apus was the "pastor of the evangelical congregation of Regensburg," Johann Christian Schäffer, who successfully devoted his time between sermons to zoological problems. He declared in 1756 that the Apus was not a "water insect" as Frisch had said, nor an aquatic centipede as somebody else had guessed, but a relative of the crayfish, the lobster and the crab. Shäffer also found the eggs of the Apus and observed that they could be dried and kept dry for years, but that they hatched when the soil containing them was thrown into a container with water. He thereby explained how Apus could occur in a given place a few days after a storm.

He also stated that a wind might pick up the dry eggs with dust and blow it to a place where Apus had not occurred for a long time. But then Schäffer found that he had researched himself into a corner from which he did not know how to escape.

He had carefully examined a large number of specimens and found that they all had eggs and thus were *all females!* He collected the eggs and let them hatch later. Another generation, every one of them a female! They laid eggs and Schäffer collected them.

This time he let each egg hatch in its separate container.

"I succeeded," he reported, "in that some of them grew up and I obtained eggs from them and young from these eggs. This was enough proof for me that they can produce and discharge fertile eggs without fertilization."

But after he had written down what his own observations had made clear, he found that he had observed something impossible — you could have eggs without a male around, but you could not have *fertile* eggs.

We now know that some arthropods can do just that, that unfertilized eggs will hatch into more females and that fertilization is the classical *conditio sine qua non* only if more males are to be produced.

Schäffer did not know this and the only way he could reconcile his observations and his convictions was to assume that the females he had examined were in reality hermaphrodites with both male and female sex glands. It wasn't so, but if Schäffer hadn't found this excuse, he would never have slept soundly again — unless, of course, he had gone on to become the discoverer of parthenogenesis.

BY ONE of these accidents of which the history of science is rich, the *male* Apus was discovered precisely one century after old Schäffer had published his observations. The discoverer was the Polish zoologist Kuzobowsky, the place of the discovery a puddle near Cracków. Between these two dates there were two occurrences of Apus which did not influence its investigation and did not increase the store of knowledge, but which are worth mentioning.

It was during the Napoleonic wars, in 1806, that Johann Wolfgang von Goethe, poet, statesman and amateur scientist, received a speciment of Apus. He was intensely interested and since business of all kinds did not permit him to hunt for Apus himself, he enlisted the aid of whoever was willing to do it for him. He offered a whole *Thaler* for an-

other specimen, a guilder for the specimen after that and decreasing prizes for more, ending up with a minimum of six *pfennigs*.

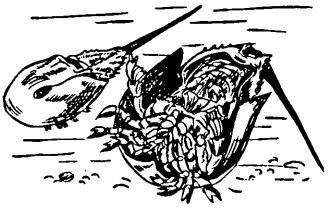
The inhabitants of Jena shook their heads, but many of them could use a *Thaler* and went looking. Without success, though, for Goethe never got to see a second Apus.

In Vienna, on the other hand, the circumstances were reversed. During the night from the 12th to the 13th of August, 1821, a rainstorm of fantastic magnitude and intensity burst over Vienna and vicinity. It was so powerful that all gutters were flooded and stayed flooded for weeks. Apus appeared in enormous numbers in these puddles and the women who always sold fish tried to sell Apus, too — but without finding any takers.

After Kuzobowsky had reported that the male Apus existed and could be found on occasion, the scene shifted once more, this time to Franconia, where Apus had put in an appearance for several years running, which in itself is a minor miracle.

The zoologist Karl Theodor Ernst von Siebold decided to find out once and for all whether the males, now known to exist, were needed for continuation of the species. He found what already had been mentioned, namely that fertilization was required for male offspring but not necessary for female offspring. The books now say that von Siebold was the rediscoverer of parthenogenesis, which is the technical term for this phenomenon. He is called rediscoverer because it was later established that other zoologists had preceded him, though without finding any acceptance.

SINCE I had to compare Apus with the horseshoe crab as regards appearance, it is necessary to say a few words about this by no means rare inhabitant of the shallow waters of the Atlantic coast of the North American continent and of the shallow waters around the Spice Islands.

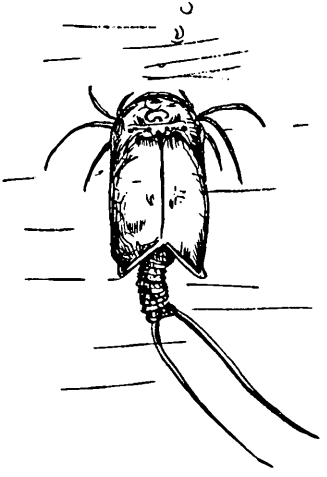


Limulus polyphemus, the horseshoe crab, which looks quite similar but is an arachnid

Among zoologists, the horseshoe crab, *Limulus*, had two distinctions for a long time. One was that it was the strangest living crab, the other that it was a "living fossil," for horseshoe crabs were known from deposits 200

million years ago. That latter distinction still holds true, but scientists now know that the horseshoe crab is not a crab at all. It is still an arthropod, of course, but it belongs to the class of the arachnids. Of course you are at liberty to call it the strangest living arachnid.

As regards age, the horseshoe crab has recently received heavy competition from a relative of Apus. (I wish the specialists would get together on the names they use. In Europe, they now call their own Apus *Lepidurus apus.*)



Triops cancriformis, which has not changed for the last 200 million years

The name of the relative is *Triops cancriformis,* which looks rather like Apus, but seems to be slightly larger. Habits of occurrence are the same. The reason for mentioning it is that it has recently been found in the fossil state, in deposits from the youngest of the three subdivisions of the Triassic period, the so-called Keuper, of an age of very nearly 200 million years.

The only distinction between the living and the fossil form that could be found at all is a slight difference in size, the fossil form being the smaller one. But this could be an individual difference. It looks as if not only the "family" but the genus and probably even the species have not changed at all since the end of the Triassic period.

THE MOUNTAIN BOOMER

THE ITEM on the Mountain Boomer of western Texas and vicinity has brought in a good deal of correspondence, some of it contradictory but all of it interesting.

Several readers living in Texas, Arizona and New Mexico wrote to say that they are well acquainted with their native reptiles, that they know some of them occasionally dash about running on their hind legs, but that they had *never* heard the

Western collared lizard.

term Mountain Boomer.

A lady in New Mexico, on the other hand, did not claim to know much about reptiles, but knew that in some sections of Arizona the Gila Monster was called Mountain Boomer. There must have been some confusion somewhere, probably caused by the fact that the Mountain Boomer is *thought* to be poisonous and that the Gila Monster is *known* to be.

Finally, I have the promise of one reader in Texas to "go after it" this summer with notebook and camera.

A letter from Dr. Charles M. Bogert, chairman of the Department of Amphibians and Reptiles at the American Museum of Natural History, informed me that the term Mountain Boomer is mentioned in Dr. Leonard Stejneger's works as a synonym of the collared lizard, *Crotaphyllus collaris,* which ranges from Oregon to Mexico. Dr. Bogert explained that the collared lizard varies in color in various parts of their range, but that they are greenish in the plateau region of western Texas to western Arizona.

"In fact, the only thing wrong with Mr. Crutcher's description is the size," he wrote. "Collared lizards attain a maximum size of approximately 13 inches, and three feet was a bit of an exaggeration — the sort of thing that happens when a story is retold many years afterward."

I then checked with the *Handbook of Lizards* by Hobart M. Smith. It does not list Mountain Boomer as a synonym in the index or elsewhere, but it does have a good deal to say about the western collared lizard, *Crotaphytus collaris baileyi,* named by Stejneger. The overall length is about 13 inches, two-thirds of which are tail. Under the heading of *Habits,* it says: "If startled on flat ground where they can reach high speed in movement, they use only the hind legs, lifting the whole forepart of the body and the forelegs completely off the ground. Running in such a curious pose, they look like diminutive racing dinosaurs, waddling slightly as they rush along."

Of course they are not poisonous, although they are rather willing to bite on whatever they consider provocation. What I would still like to know, however, is why they were ever called Mountain Boomer and what is

behind the story of the "whining" lizard that was told more than half a century ago.

THE NAMES OF THE ELEMENTS

A READER in Brooklyn wrote me a letter a while back saying that, while looking through an older chemistry text, he had come across names of elements that did not agree with those with which he was familiar and asked me to tell him the names currently in use. I could not reply in the usual letter column because the answer would have been too long. But I am going to use the balance of this space for this topic now because I know that other people have been confused, too. Unless you know the history involved, it must be disconcerting to have tungsten suddenly appear under the name of wolfram, for example.

Most of the changes involve the two ends of the atomic scale because of the activities of the atomic energy experts. At the top of the scale, they merely added elements; at the bottom, they violated custom by doing something chemists do not consider "permissible" — they have given separate names to isotopes of the same element.

Element No. 1, hydrogen, is still called that if its atomic weight is "one" (approximately, that is), but double-weight or "heavy" hydrogen is deuterium, while triple-weight hydrogen is tritium. But element No. 2, helium, also has an isotope of about three units weight; this is called tralphium, though normal helium, of about four units weight, is still helium — unless you refer to its nucleus only, which is an "alpha particle."

Above helium, the sailing is clear for a while: No. 3, lithium; No. 4, beryllium; No. 5, boron; No. 6, carbon; No. 7, nitrogen; No. 8, oxygen; No. 9, fluorine and No. 10, neon.

When you come to No. 11, sodium, you may encounter a "hemispheric difference" in the naming; in Europe, it's usually natrium and its chemical symbol is *Na*.

Then there are again no problems for a while: No. 12, magnesium; No. 13, aluminum (aluminium in England, France and Germany); No. 14, silicon; No. 15, phosphorus; No. 16, sulfur; No. 17, chlorine; No. 18, argon.

With No. 19, potassium, another hemispheric difference crops up — its symbol is *K* and non-English speaking chemists call it kalium, since the name is derived from the Arab *al kaljun*, meaning wood ash.

Again there is clear sailing for a while: No. 20, calcium; No. 21, scandium; No. 22, titanium; No.

23, vanadium; No. 24, chromium; No. 25, manganese; No. 26, iron; No. 27, cobalt; No. 28, nickel; No. 29, copper; No. 30, zinc; No. 31, gallium; No. 32, germanium; No. 33, arsenic; No. 34, selenium; No. 35, bromine; No. 36, krypton; No. 37, rubidium; No. 38, strontium; No. 39, yttrium and No. 40, zirconium.

THERE was a change a number of years ago with regard to No. 41, which used to be called columbium by American chemists while everybody else called it niobium. The chemical symbol was *Nb* anywhere and now the name niobium is official everywhere. No. 42 never gave any trouble; it was always molybdenum, though the name might confuse a classical philologist, for *molybdos* is Greek for "lead." No. 43 was first called *masurium* after an area in East Prussia, presumably the home of one of its first discoverers. But it is now internationally technetium with the symbolic *Tc*.

No linguistic problems for the next dozen or so: No. 44, ruthenium; No. 45, rhodium; No. 46, palladium; No. 47, silver (that the symbol of No. 47 is *Ag* is due to the Latin word for that metal: *argentum*); No. 48, cadmium; No. 49, indium; No. 50, tin (the symbol *Sn* is based on the Latin word for tin, *stannum*); No. 51, antimony (symbol is *Sb* from Latin name *stibium*); No. 52, tellurium; No. 53, iodine; No. 54, xenon; No. 55, caesium and No. 56, barium.

But now we get into turbulent waters, for we have arrived at the group called the rare earth metals. I have just looked at half a dozen popular books on chemistry and found that some authors believe in simplifying their own life rather than that of the reader when they come to the rare earths. Some simply wrote in their tables: "Nos. 51-71, rare earths" and two just said "Nos. 51-71." So I had better give the list first, beginning with the atomic number, followed by the chemical symbol, then the atomic weight (latest information I have, which may not be late enough) and finally the name:

57	La	138.92	lanthanium
58	Ce	140.13	cerium
59	Pr	140.92	praseodymium
60	Nd	144.27	neodymium
61	Pm	144.50	promethium
62	Sm	150.43	samarium
63	Eu	152.0	europium
64	Gd	156.9	gadolinium
65	Tb	159.2	terbium
66	Dy	162.46	dysprosium
67	Ho	163.5	holmium
68	Er	167.2	erbium
69	Tm	169.4	thulium
70	Yb	173.04	ytterbium
71	Lu	174.99	lutetium

IN OLDER books, you may find a "didymium" listed, which was just based on insufficient knowledge. Carl, Count Auer von Welsbach, the Austrian chemist, established that there were two elements he named praseodymium ("green twin") and neodymium ("new twin"). The word didymium meant "twin," too; it was supposed to be the "twin of lanthanum."

No. 61 was called "illinium" (from Illinois) at first; the definite identification and the name prometheum originated at Oak Ridge. Nos. 70 and 71 were discovered independently and nearly simultaneously by Auer von Welsbach of Austria and Georges Urbain of France. The names proposed by Auer von Welsbach (but not accepted) were *aldebaranium* for No. 70 and *cassiopeium* for No. 71. The now accepted names are both based on place names, Ytterby in Sweden and *Lutetia*, the original Latin name of Paris.

The next element above the rare earths is No. 72, hafnium. There never was any trouble with the name; the amusing thing is that it was coined by a Hungarian (Georg von Hevesy) who was then working in Copenhagen, which is Kjöbenhavn in Danish — at least most of the time, since they use two forms.

Now again things will go smoothly for a while: No. 73, tantalum; No. 74 — sorry, I talked too soon — No. 74 is the element with the symbol *W*, standing for wolfram, formerly known by its Swedish name of tungsten, now officially abolished. Then No. 75, rhenium (from Latin *Rhenus*, the Rhine); No. 76, osmium; No. 77, iridium; No. 78, platinum; No. 79, gold (the symbol *Au* is from the Latin name *aurum*); No. 80, mercury (symbol *Hg* from its old name *Hydrargium*); No. 81, thallium; No. 82, lead (symbol *Pb* is from

Latin name *plumbum*); No. 83, bismuth; No. 84, polonium.

No. 85 was called alabamine (from Alabama) for some time, but the name is now astatine (from the Greek *astasia*, meaning "unsteady") and the symbol *At*, the reason being that of all of its isotopes known, the "longest-lived" has a half-life of about eight hours.

No. 86 is radon, symbol *Rn;* its first name immediately after discovery was "radium emanation." Since this was a clumsy word, the name "niton" was proposed, but radon was chosen.

No. 87 is now francium; an earlier claim to its discovery had proposed the name virginium. The symbol for francium is *Fa.* No. 88 is radium; No. 89, actinium; No. 90, thorium; No. 91, protactinium (the alternate form of the name, protoactinium, has been dropped) and No. 92, uranium. This was for many years considered the heaviest (with reference to its *atomic* weight) naturally occurring element.

Only fairly recently was it discovered that plutonium, which has a still higher atomic weight, does occur naturally in the very faintest of traces — it is far rarer naturally than the very rare radium. It is fully justified, therefore, to call all the "trans-uranic elements" artificial.

No. 93 is neptunium, No. 94, plutonium, with the symbols *Np*, and *Pu*. No. 95 is americium (symbol *Am*), No. 96, curium (symbol *Cm*) and Nos. 97 and 98, californium and berkelium, with the symbols *Cf* and *Bk*.

Should the whole mess be simplified? No doubt, but I'm afraid the revision would cause even more argument and confusion, calling for top-level conferences. Meanwhile, chemists can and do work with it, which is the important thing.

— WILLY LEY