Whales Have an Alphabet

0:05

from The New York Times I'm Michael

0:07

babbaro this is the

0:10

daily

0:11

today ever since the discovery that

0:14

whales produce songs scientists have

0:17

been trying to find a way to decipher

0:20

their

0:21

lyrics after 60 years they may have

0:26

finally done

0:28

it my colleague Carl Zimmer

0:32

explains it's Friday May

0:38

[Music]

0:44

24th hi Carl hello I have to say after

0:48

many years of working with you on

0:50

everything from the pandemic to crisper

0:55

crisper DNA technology that it turns out

0:57

your interests are even more varied than

0:59

I thought and they include whales they

1:02

do indeed and why I mean what is it

1:06

about the whale that captures your

1:08

imagination I don't think I've ever met

1:10

anybody who is not fascinated by whales

1:13

I mean these

1:14

are mammals like us and they're swing

1:17

around in the water they have brains

1:21

that are much bigger than ours they can

1:25

live maybe 200 years these are

1:28

incredible animals and animals that we

1:31

still don't really understand right well

1:33

it is this Majestic creature that brings

1:36

us together today Carl because you have

1:39

been reporting on a big breakthrough in

1:43

our understanding of how it is that

1:46

whales communicate but I think in order

1:48

for that breakthrough to make sense I

1:52

think we're going to have to start with

1:54

what we have known up until now about

1:57

how whales interact so tell us about

2:01

that well people knew that whales and

2:04

dolphins traveled together in groups but

2:08

up until the 1960s we didn't really know

2:11

that whales actually made any sounds at

2:13

all it was actually sort of an accident

2:16

that we came across it the American

2:19

Military was developing sophisticated

2:23

microphones to put underwater they

2:26

wanted to listen for Russian submarines

2:28

naturally as one does but there was an

2:32

engineer in Bermuda and he started

2:35

hearing some weird

2:39

stuff and he wondered maybe if he was

2:43

actually listening to whales what made

2:46

him wonder if it was whales of all

2:48

things well this sound did not sound

2:51

like something

2:55

[Music]

2:57

geological it didn't sound like some

3:00

underwater Landslide or something like

3:02

that this sounded

3:04

like a living animal making some kind of

3:08

call it has these incredible deep tones

3:13

that rise up into these strange almost

3:15

falsetto type

3:20

[Music]

3:23

notes it was incredibly loud and so it

3:26

would have to be some really big animal

3:29

and so with humpback whales suing around

3:32

Bermuda this engineer thought well maybe

3:34

these are humpback

3:36

whales and so he gets in touch with a

3:39

husband and wife team of whale

3:41

biologists Roger and ktie Payne and

3:45

plays these recordings to them and

3:48

they're pretty convinced that they're

3:50

hearing whales

3:52

too and then they go on to go out and

3:57

confirm that by putting microphones in

3:59

the water chasing after groups of whales

4:02

and confirming yes indeed these sounds

4:04

are coming from these humpback

4:10

whales so once these scientists confirm

4:13

in their minds that these are the sounds

4:15

of a whale what happens with this

4:17

Discovery Well Roger and Katie Payne and

4:19

their colleagues are astonished that

4:23

this species of whale is swimming around

4:27

singing all the time for hours on end

4:31

and it's so inspirational to them that

4:33

they actually helped to produce a record

4:36

that they release the song of the

4:38

humpback whale in 1970

4:41

H and so this is being sold in record

4:45

stores you know along with Jimmy

4:47

Hendricks and Rolling Stones and it is a

4:51

huge

4:52

hit really yeah it sells like 2 million

4:55

copies wow well at the time it was a

4:59

huge cultural event this

5:02

record this became almost like an Anthem

5:06

of the environmental movement H and it

5:09

led for Wales in particular to a lot of

5:12

protections for them because now people

5:15

could appreciate that whales were a lot

5:18

more marvelous and mysterious than they

5:20

maybe had appreciated before and so you

5:23

have legislation like The Marine Mammal

5:25

act the United States just agrees just

5:27

to stop killing whales stops its whaling

5:30

industry and so you could argue that the

5:33

discovery of these whale songs in

5:36

Bermuda led to at least some species of

5:39

whales escaping

5:41

[Music]

5:45

Extinction well beyond the cultural

5:47

impact of this discovery which is quite

5:50

meaningful I wonder whether scientists

5:53

and marine biologists are figuring out

5:55

what these whale songs are actually

5:58

communicating

6:00

so the pains create a whole branch of

6:03

science the study of whale songs it

6:05

turns out that pretty much every species

6:07

of whale that we know of sings in some

6:11

way or another and it turns out that

6:14

within a species different groups of

6:17

whales and different parts of the world

6:19

may sing with a different dialect but

6:22

the big question of what these whales

6:24

are singing what do these songs mean

6:27

that remains elusive into the 21st

6:30

century and things don't really change

6:33

until scientists decide to take a new

6:37

look at the problem in a new way and

6:40

what is that new way so in 2020 a group

6:43

of whale biologists including Roger pain

6:45

come together with computer scientists

6:47

from

6:48

MIT instead of humpback whales which

6:52

were the whales where whale songs are

6:54

first discovered these scientists decide

6:57

to study sperm wh in the Caribbean and

7:01

hump Beck whales and sperm whales have

7:04

very very different songs so if you're

7:06

used to hump Beck whales with their

7:09

crazy high and low singing voices um

7:13

right those bestselling sounds those

7:15

rocking tunes of the humpback whales

7:18

that's not what sperm whales do sperm

7:20

whales have a totally different way of

7:23

communicating with each other and I

7:26

actually have some recordings that were

7:29

provided Ed by the scientists who have

7:32

been doing this research and so we can

7:35

take a listen to some of

7:39

them oh wow it's like a rhythmic

7:47

clicking these are a group of sperm

7:50

whales swimming

7:52

together communicating

7:59

so wh biologists knew already that there

8:04

was some structure to this sound those

8:08

clicks that you hear they come in little

8:11

pulses and each of those pulses is known

8:14

as a Koda and whale biologist had given

8:17

names to these different kodas so for

8:20

example they call one Coda 1 + one plus

8:25

three which is basically click click

8:29

click click click or four plus three

8:31

where you have four Clicks in a row and

8:34

a pause and then three Clicks in a row

8:36

right and the question would seem to be

8:37

is this decipherable communication or is

8:39

this just whale gibberish well this is

8:41

where the computer scientists were able

8:43

to come in and to help out the whale

8:46

biologists who were listening to the

8:49

kodas from the sperm whales in the

8:50

Caribbean they had identified about 21

8:53

types uh and then that would seem to be

8:55

about it mhm but then MIT computer

8:59

science graduate student named prusia

9:02

Sharma was given the job of listening to

9:04

them again and what does she hear in a

9:07

way it's not so much what she heard but

9:09

what she

9:12

saw because when scientists record whale

9:16

songs you can look at it kind of like if

9:18

you're looking at an audio recording of

9:20

your podcast you will see the little

9:22

squiggles of your voice right and so

9:25

whale biologists would just look at that

9:27

ticker of whale songs going across the

9:31

screen and try to compare them and

9:34

Sharma said I don't like this I just

9:37

this is not how I look at data and so

9:39

what she decided to do is she decided to

9:41

kind of just visualize the data

9:44

differently and essentially she just

9:47

kind of flipped these images on their

9:49

side and saw something totally

9:52

new and what she saw was that sperm

9:56

whales were singing

10:00

a whole bunch of things that nobody had

10:01

actually been

10:03

[Music]

10:08

hearing one thing that she discovered

10:11

was that you could have a whale that was

10:15

producing aota over and over and over

10:18

again but it was actually playing with

10:20

it it was actually stretching out the

10:25

Koda so it would get a little bit longer

10:27

and a little bit longer a little bit

10:28

longer

10:31

and then get shorter and shorter and

10:33

shorter again they could play with their

10:37

kodas in a way that nobody knew

10:39

before and she also started to see that

10:43

a whale might throw in an extra click at

10:46

the end of

10:48

aota so it would be repeating aota over

10:50

and over again and then boom add an

10:52

extra one uh right at the

10:54

end what they would call an

10:56

ornamentation so now you have yet

10:58

another

10:59

signal that these whales are using and

11:03

if we just look at what the sperm whales

11:07

are capable of producing in terms of

11:10

different kodas we go from just 21 types

11:15

that they had found in the Caribbean

11:16

before to

11:19

156 so what the scientists are saying is

11:23

that what we might be looking at is what

11:27

they call a sperm phonetic alphabet wow

11:32

yeah that's a pretty big deal because

11:34

the only species that we know of for

11:37

sure that has a phonetic alphabet is us

11:39

is US exactly so the reason that we can

11:44

use language is because we can make a

11:47

huge range of sounds by just doing

11:50

little things with our mouths a little

11:53

change in our lips can change up B to a

11:56

du and so we are able to produce a set

12:01

of phonetic sounds and we put those

12:03

sounds together to make words M so now

12:07

we have sperm whales which have at least

12:10

150 of these different versions of

12:13

sounds that they make just by making

12:15

little adjustments to the existing way

12:18

that they make sounds and so you know

12:20

you can make a chart of their phonetic

12:22

alphabet just like you make a chart of

12:24

the human phonetic

12:27

alphabet so then that raises the

12:30

question do they combine their phonetic

12:34

alphabet into words do they combine

12:37

their words into sentences in other

12:39

words do sperm whales have a language of

12:42

their own right are they talking to each

12:45

other really talking to each

12:47

other if we could really show that

12:52

whales had language on par with humans

12:55

that would be like finding intelligent

12:58

life on another

13:00

[Music]

13:10

planet we'll be right

13:13

back so Carl how should we think about

13:15

this phonetic alphabet and whether sperm

13:18

whales are actually using it to talk to

13:22

each other the scientists on this

13:25

project are really careful to say that

13:29

that these results do not definitively

13:32

prove what these sperm whale sounds are

13:36

there are a handful of possibilities

13:38

here in terms of what this study could

13:40

mean and one of them is that the whales

13:44

really are using full-blown language

13:47

what they might be talking about we

13:50

don't know I mean perhaps they like to

13:53

talk about their travels over hundreds

13:56

and thousands of miles maybe they're

13:58

talking about you know the giant squid

14:00

that they caught last night maybe

14:03

they're gossiping about each other and

14:05

you have to remember sperm whales are

14:07

incredibly social animals they have

14:10

relationships that last for decades and

14:13

they live in groups that are in clans of

14:16

thousands of whales I mean imagine the

14:19

opportunities for gossip right these are

14:21

all at least imaginable now but it's

14:24

also possible that they are

14:26

communicating with each other but in way

14:29

that isn't language as we know it you

14:32

know maybe these sounds that they're

14:34

producing don't add up to sentences

14:37

there's no verb there there's no noun

14:39

there's no structure to it in terms of

14:42

how we think of language but maybe

14:44

there's still conveying information to

14:46

each other maybe they're somehow giving

14:49

out who they are and what group they

14:52

belong to but it's not in the form of

14:54

language that we think of right maybe

14:55

it's more kind of caveman likee as in

14:58

whale to whale look there food it's

15:02

possible but you know other species have

15:04

evolved in other directions and so you

15:07

have to put yourself in the place of a

15:10

sperm whale you know so think about this

15:13

they are

15:14

communicating in the water and actually

15:17

like sending sounds through water is a

15:19

completely different experience than

15:21

through the air like we do so a sperm

15:23

whale might be communicating to the

15:27

whale right next to it a few yards away

15:31

but it might be communicating with

15:34

whales miles away hundreds of miles away

15:38

they're in the dark a lot of the time so

15:41

they don't even see the whales right

15:43

next to them so it's just this constant

15:45

sound that they're making because

15:48

they're in this dark

15:50

water so we might want to imagine that

15:55

such a species would talk the way we do

15:59

but there's just so many reasons to

16:00

expect that whatever they're

16:03

communicating might be just profoundly

16:06

different so different that it's

16:07

actually hard for us to

16:10

imagine and so we need to really you

16:13

know let ourselves be open to lots of

16:16

possibilities and one possibility that

16:18

some scientists have raised is that

16:19

maybe language is just the wrong model

16:23

to think about maybe we need to think

16:25

about music H you know maybe this

16:29

strange typewriter clickey clack is

16:32

actually not like a morse code message

16:34

but is actually a real song it's a kind

16:38

of music that doesn't necessarily convey

16:42

information the way conversation does

16:46

but it brings the whales

16:48

together in humans like when we humans

16:51

sing together in choruses it can be a

16:53

very emotional experience it's a

16:55

socially bonding experience but it's not

16:58

really like the specific words that

17:00

we're singing that bring us together

17:02

when we're singing It's sharing the

17:05

music

17:06

[Music]

17:11

together but at a certain point we sto

17:13

singing in the chorus and we start

17:15

asking each other questions like hey

17:17

what are you doing for dinner how you

17:18

going to get home there's a lot of

17:19

traffic on the BQE so we are really

17:22

drawn to the

17:24

possibility that whales are

17:26

communicating in that same kind of a

17:28

mode we're

17:29

exchanging information we're seeking out

17:33

each other's well-being and emotional

17:35

state and we're building something

17:37

together and I think that happens

17:41

because I mean language is so

17:44

fundamental to us as human beings I mean

17:47

it's like every moment of our Waking

17:51

Life depends on language we are talking

17:54

to ourselves if we're not talking to

17:56

other people in our sleep we dream and

17:58

and there are words in our dreams and

18:01

we're just stewing in language and so

18:04

it's really really hard for us to

18:07

understand how other species might have

18:10

a really complex communication system

18:14

with hundreds of different little units

18:18

of sound that they can use and they can

18:20

deploy and to think anything other than

18:23

well they must be talking about traffic

18:25

on the BQ like we're very human Centric

18:29

and we have to resist that so what we

18:32

end up having here is a genuine

18:33

breakthrough in our understanding of how

18:35

whales interact and that seems worth

18:38

celebrating in and of itself but it

18:40

really kind of doubles as a lesson in

18:42

humility for us humans when it comes to

18:46

appreciating the idea that there are

18:49

lots of nonhuman ways in which language

18:52

can exist that's right humility is

18:55

always a good idea when we're thinking

18:57

about other animals

18:59

so what now happens in this realm of

19:05

research and how is it that these

19:08

scientists these marine biologists and

19:10

these computer scientists are going to

19:12

try to figure out what exactly this

19:14

alphabet amounts to and how it's being

19:18

used so what's going to happen now is a

19:21

real C change in gathering data from

19:25

Wales so to speak

19:29

so the these scientists are now

19:32

deploying a new

19:34

generation of undc

19:37

microphones they're using drones to

19:40

follow these whales and what they want

19:43

to do is they want to be

19:46

recording sounds from the ocean where

19:49

these whales live 24 hours a day 7 days

19:52

a week and so the hope is that instead

19:56

of getting say a few hundred kodas each

19:59

year on recording these scientists want

20:02

to get several hundred million every

20:04

year H maybe billions of kodas every

20:08

year and once you get that much data

20:11

from Wales then you can start to do some

20:14

really amazing stuff with artificial

20:17

intelligence so these scientists hope

20:19

that they can use the same kind of

20:21

artificial intelligence that is behind

20:24

things like chat GPT or these artificial

20:28

intell systems that are able to take

20:31

recordings of people talking and

20:33

transcribing them into text they want to

20:35

use that on the whale communication they

20:40

want to just grind through vast amounts

20:42

of data and maybe they will discover

20:45

more phonetic letters in this

20:48

alphabet who knows maybe they will

20:51

actually find bigger structures

20:52

structures that could correspond to

20:55

language if you go really far down this

20:58

route out of possibilities the hope is

21:01

that you would understand what sperm

21:04

Wells are saying to each other so well

21:06

that you could actually create

21:08

artificial sperm whale communication and

21:11

you could play it underwater you could

21:14

talk to the sperm Wells

21:17

H and they would talk back they would

21:20

react somehow in a way that you had

21:23

predicted if that happens

21:26

then maybe indeed sperm whales have

21:30

something like language as we understand

21:34

it and the only way we're going to

21:35

figure that out is if we figure out not

21:38

just how they talk to themselves but how

21:39

we can perhaps talk to them which given

21:44

everything we've been talking about here

21:45

Carl is a little bit ironic because it's

21:48

pretty human Centric that's right this

21:51

experiment could fail it's possible that

21:53

sperm whs don't do anything like

21:56

language as we know it maybe they're

21:59

doing something that we can't even

22:01

imagine yet but if sperm Welles really

22:05

are using kodas in something like

22:09

language we are going to have to enter

22:11

the conversation to really understand

22:19

it well Carl thank you very much we

22:22

appreciate it thank you sorry can I say

22:26

that again my voice got really high all

22:27

of a sudden it's a little bit like a

22:29

whales yeah

22:33

exactly try again thank you no um thank

22:37

[Music]

22:54

you we'll be right back

23:01

here's what else you need to know today

23:04

we alleg that Live Nation has illegally

23:06

monopolized markets across the live

23:08

concert industry in the United States

23:10

for far too long it is time to break it

23:14

up on Thursday the justice department

23:17

sued the concert giant Live Nation

23:20

entertainment which owns Ticket Master

23:22

for violating Federal Anti-Trust laws

23:25

and sought to break up the 23 billion

23:29

conglomerate during a news conference

23:31

attorney general Merrick Garland said

23:33

that live nation's monopolistic tactics

23:36

had hurt the entire industry of Live

23:39

Events the result is that fans pay more

23:42

in fees artists have fewer opportunities

23:45

to play concerts smaller promoters get

23:48

squeezed out and venues have fewer real

23:52

choices in a statement Live Nation

23:54

called the lawsuit baseless and vowed to

23:58

fight it in

24:02

court a reminder tomorrow we'll be

24:05

sharing the latest episode of our

24:07

colleagues new show the interview this

24:10

week on the interview Lulu Garcia novaro

24:13

talks with Ted sarandos the CEO of

24:16

Netflix about his plans to make the

24:18

world's largest streaming service even

24:21

bigger I don't agree with the premise

24:25

that quantity and quality are somehow in

24:27

conflict with each other I think our

24:29

content and our movie programming has

24:30

been great but it's just not all for

24:35

you today's episode was produced by Alex

24:38

Stern Stella tan cydney Harper and Nina

24:42

Feldman it was edited by MJ Davis Lyn

24:45

contains original music by Pat mccusker

24:48

Dan Powell Alicia baitu Maran Lozano and

24:53

Sophia landman our theme music is by Jim

24:56

brunberg and Ben lansberg of wonderlake

24:59

special thanks to project seti for

25:01

sharing their wheel

25:03

[Music]

25:06

recordings that's it for the daily I'm

25:09

Michael raro see you on Tuesday after

25:13

the holiday

25:15

[Music]