

DRAGON  ZAKURA

ドラゴン桜

TOKYO'S RESEARCH TO SHAPE THE FUTURE



DISCOVER
HOW TODAY'S
RESEARCH
IN TOKYO
IS BUILDING
A BETTER
TOMORROW!



東京都

CHARACTERS



KENJI SAKURAGI

A LAWYER AND TEACHER, AND THE MAIN CHARACTER OF DRAGON ZAKURA. AFTER SUCCESSFULLY RESCUING RYUZAN HIGH SCHOOL FROM THE BRINK OF FAILURE, HE HAS BEEN INVITED TO TOKYO'S SHIOMIGAOKA HIGH SCHOOL TO HELP OUT THEIR CAREER RESEARCH PROGRAM. HE IS A HARSH REALIST, BUT ALSO HAS A DEEPLY EMPATHETIC SIDE.

AN 11TH GRADER AT SHIOMIGAOKA HIGH SCHOOL. SHE IS MORE INTERESTED IN THE STUDY OF HUMANITIES THAN SCIENCE, AND PRETENDS TO BE INDIFFERENT TO HER FUTURE. IN THE BACK OF HER MIND, SHE ALWAYS WORRIES ABOUT HER HEALTH AFTER CANCER HAS AFFECTED HER FAMILY.



**RINA TODO
(11TH GRADER)**

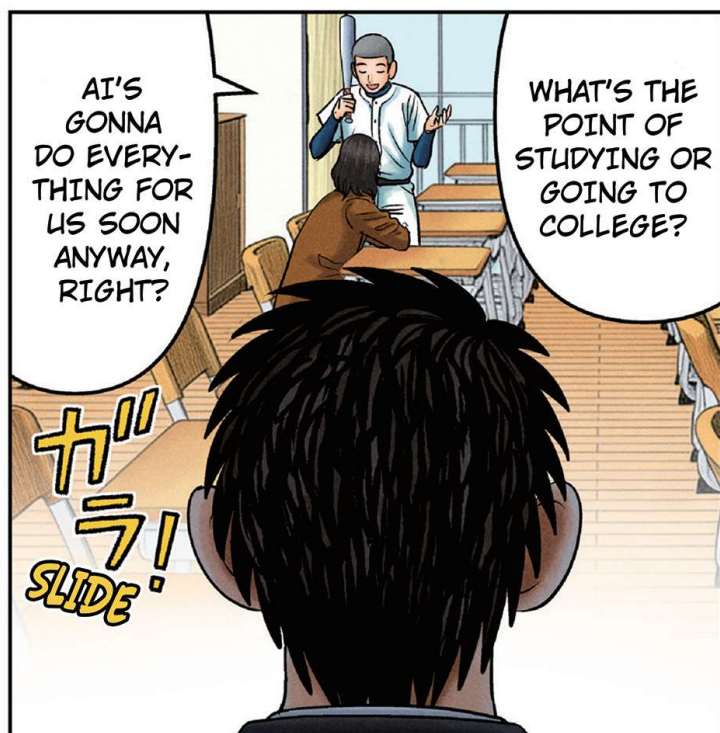
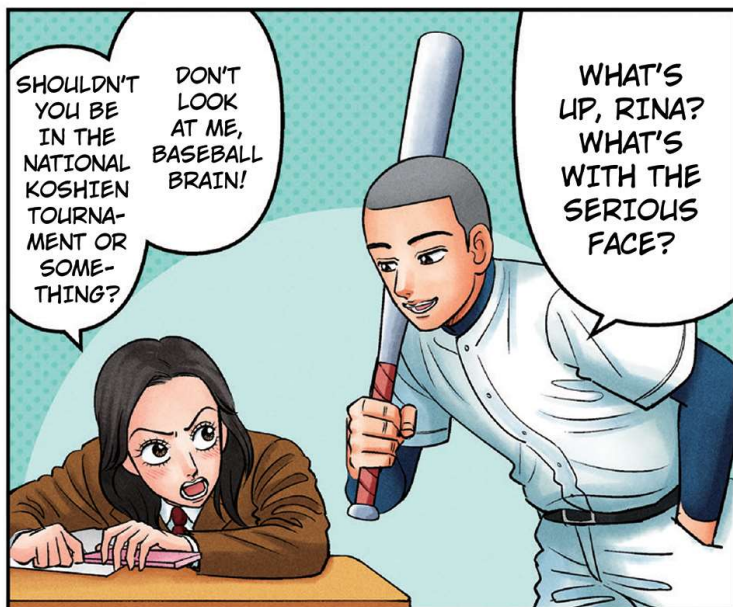
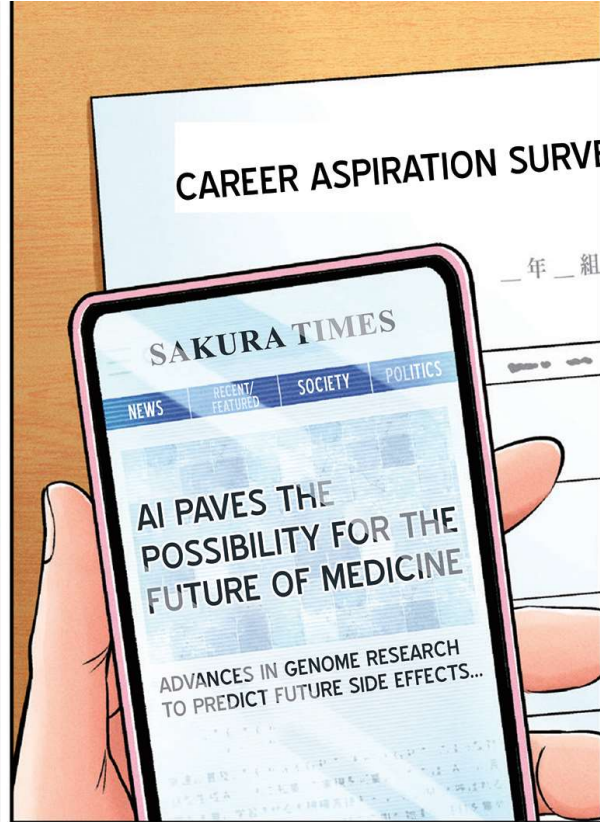
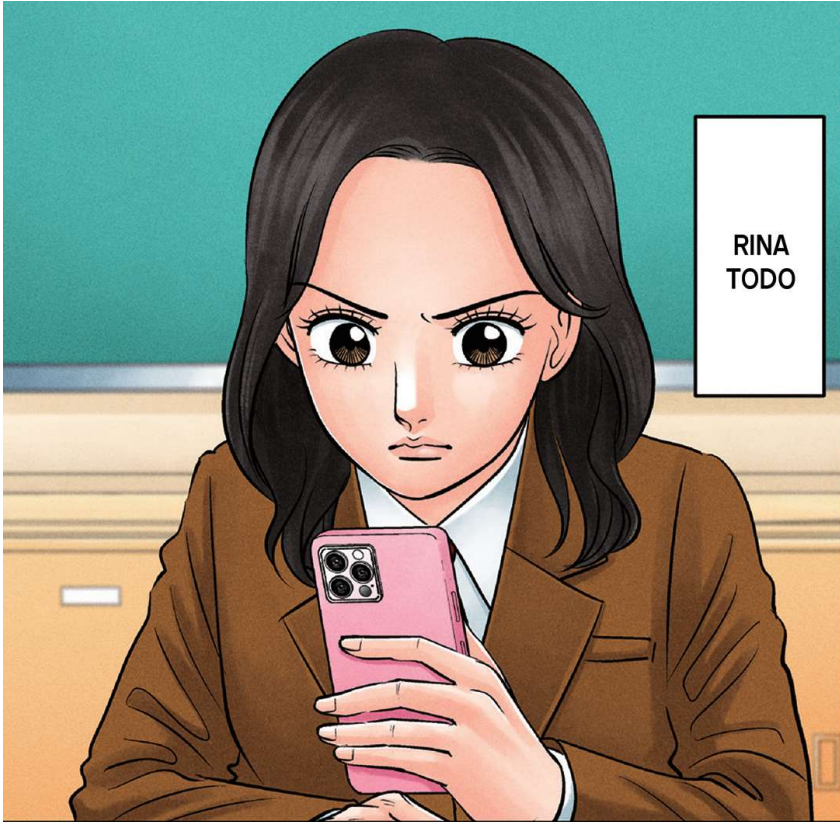
AN 11TH GRADER AT SHIOMIGAOKA HIGH SCHOOL WHO CARES MORE ABOUT BASEBALL THAN HIS FUTURE. HE DOESN'T ALWAYS SHOW IT ON HIS FACE, BUT HE IS HONEST AND A QUICK THINKER.

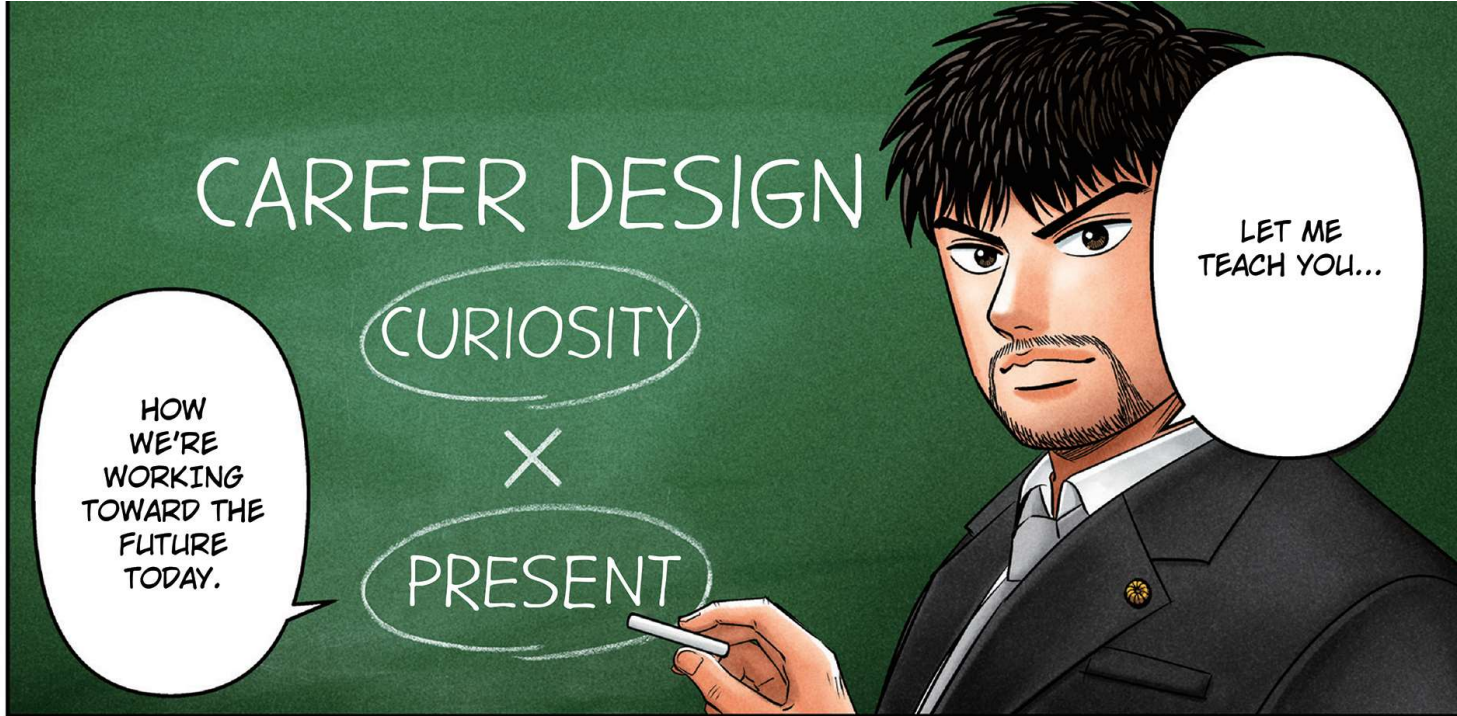
**YUGO SATO
(11TH GRADER)**



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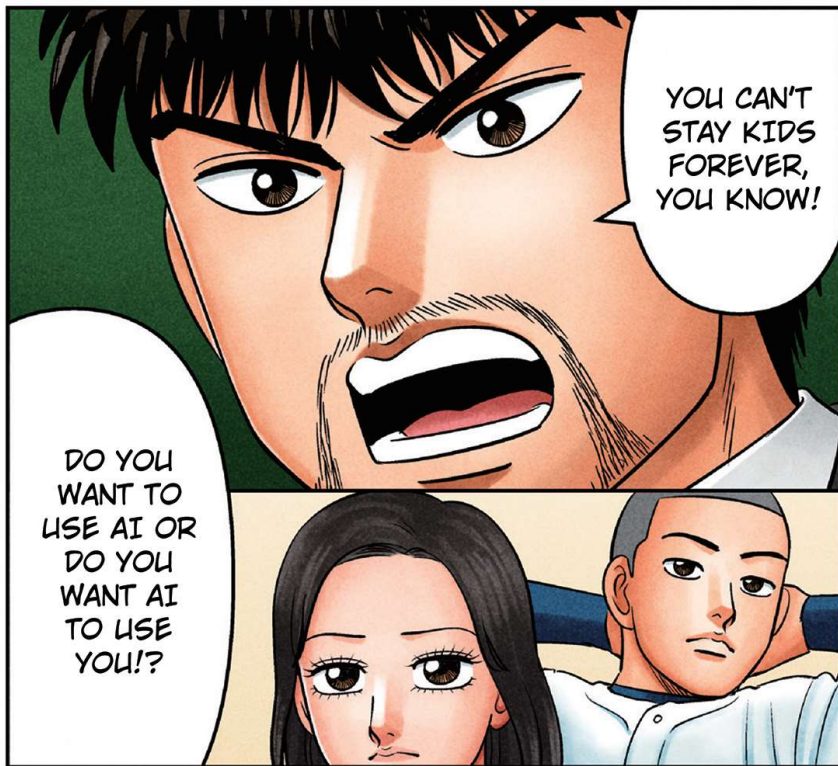




HOW WE'RE WORKING TOWARD THE FUTURE TODAY.

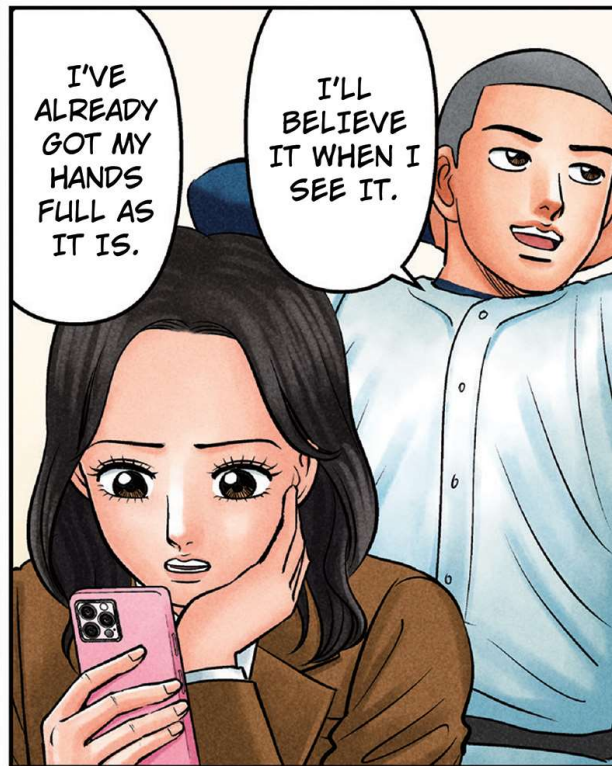
CURIOSITY
X
PRESENT

LET ME TEACH YOU...



YOU CAN'T STAY KIDS FOREVER, YOU KNOW!

DO YOU WANT TO USE AI OR DO YOU WANT AI TO USE YOU!?



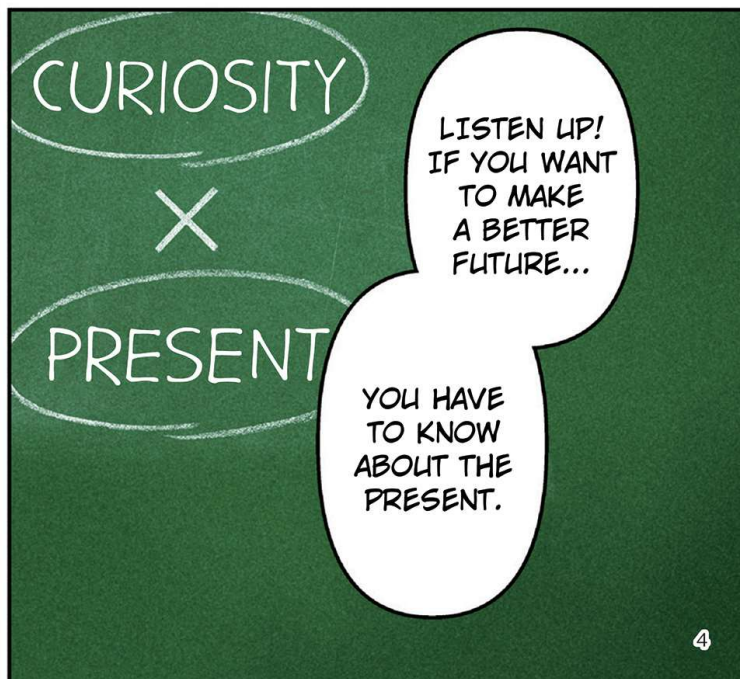
I'VE ALREADY GOT MY HANDS FULL AS IT IS.

I'LL BELIEVE IT WHEN I SEE IT.



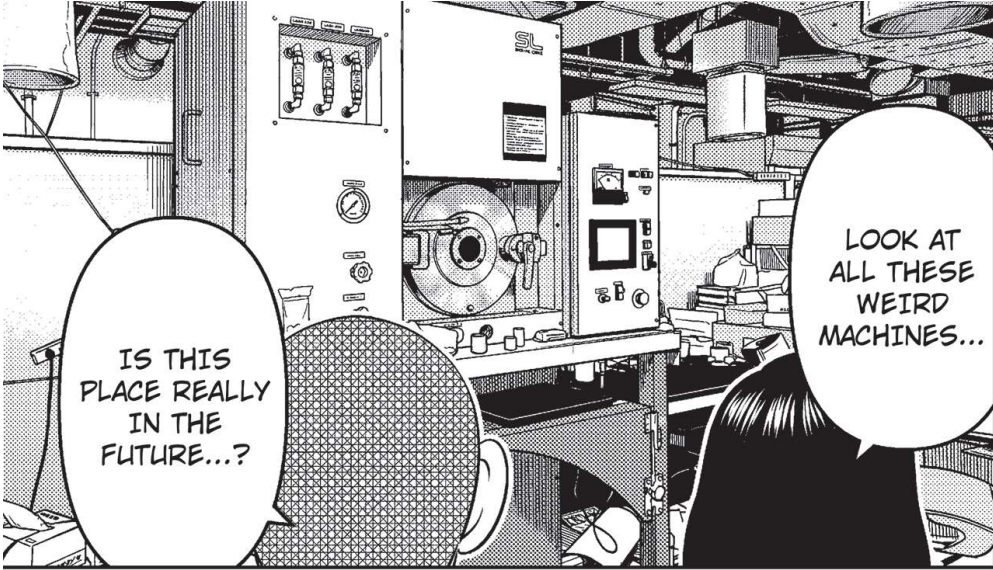
I'M GONNA TAKE YOU TO SEE THE FUTURE RIGHT NOW!

LET'S GO ON A FIELD TRIP!



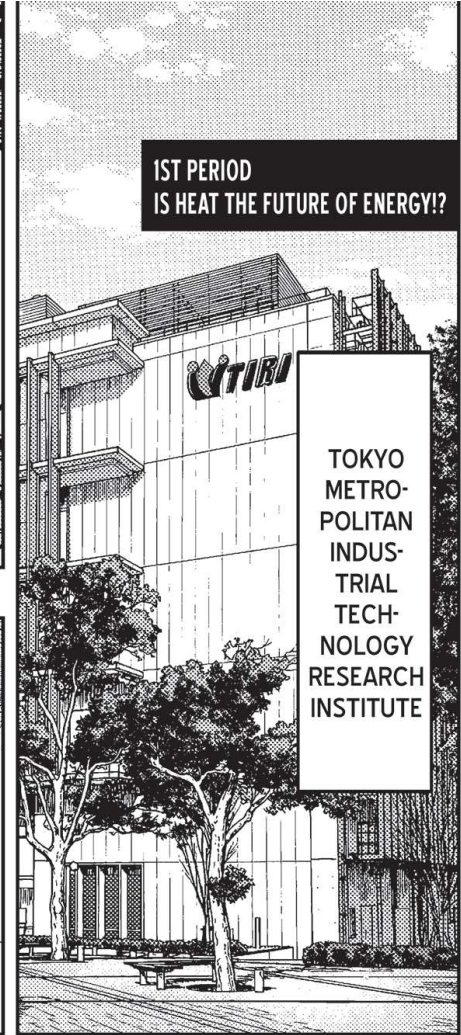
CURIOSITY
X
PRESENT

LISTEN UP! IF YOU WANT TO MAKE A BETTER FUTURE... YOU HAVE TO KNOW ABOUT THE PRESENT.



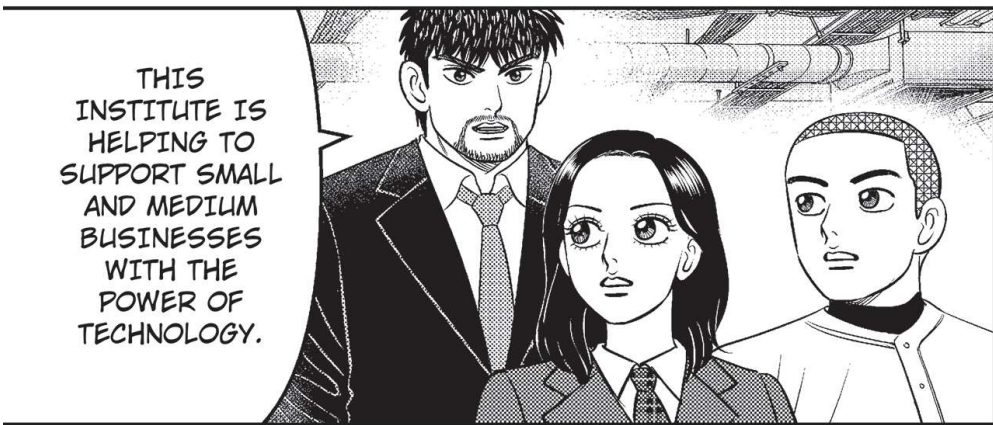
IS THIS PLACE REALLY IN THE FUTURE...?

LOOK AT ALL THESE WEIRD MACHINES...

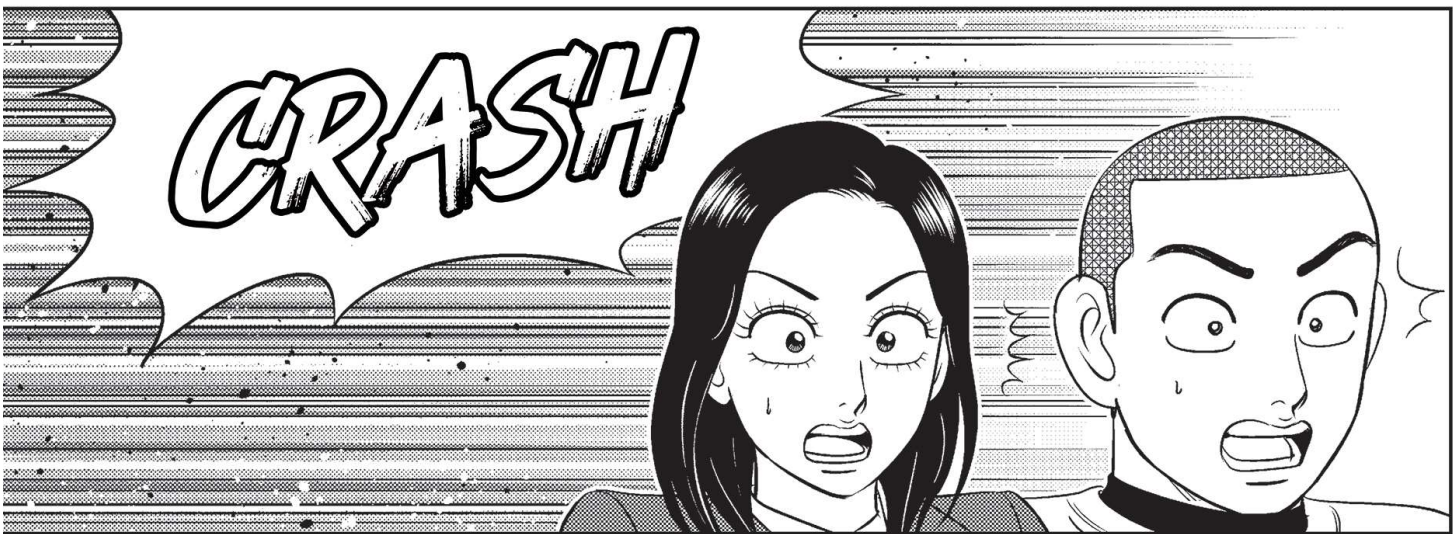


IST PERIOD IS HEAT THE FUTURE OF ENERGY?!

TOKYO METROPOLITAN INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE



THIS INSTITUTE IS HELPING TO SUPPORT SMALL AND MEDIUM BUSINESSES WITH THE POWER OF TECHNOLOGY.



CRASH



KAMIKI RESEARCHER



SORRY IF I SCARED YOU.

AN ACCIDENT ...!?

WHAT WAS THAT!?



EVERYTHING THAT PASSES THE TESTS HERE IS UTILIZED IN OUR DAILY LIVES.

WE'RE CURRENTLY TESTING PRODUCT DURABILITY FOR SMALL- AND MEDIUM-SIZED COMPANIES.

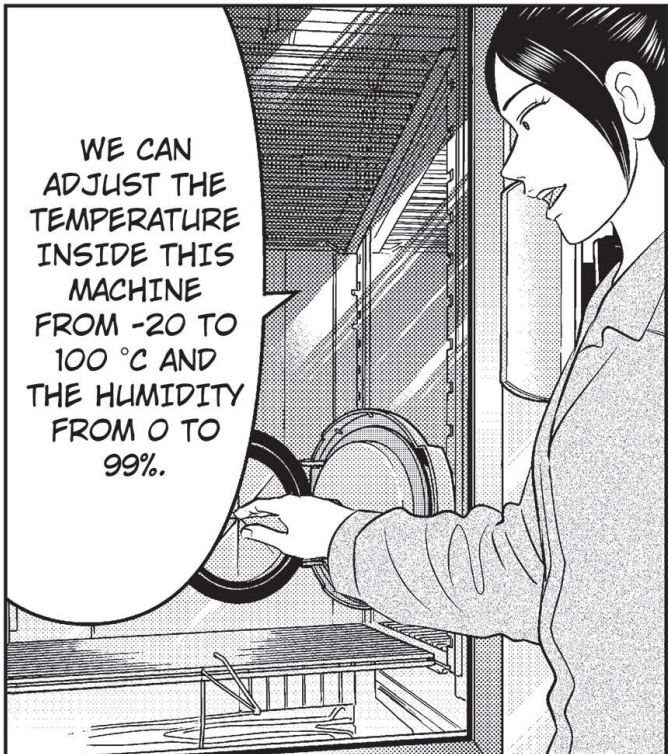


IT'S HUGE...

IS THIS WHAT MADE THAT NOISE BEFORE...?



FOLLOW ME INTO THE NEXT ROOM.

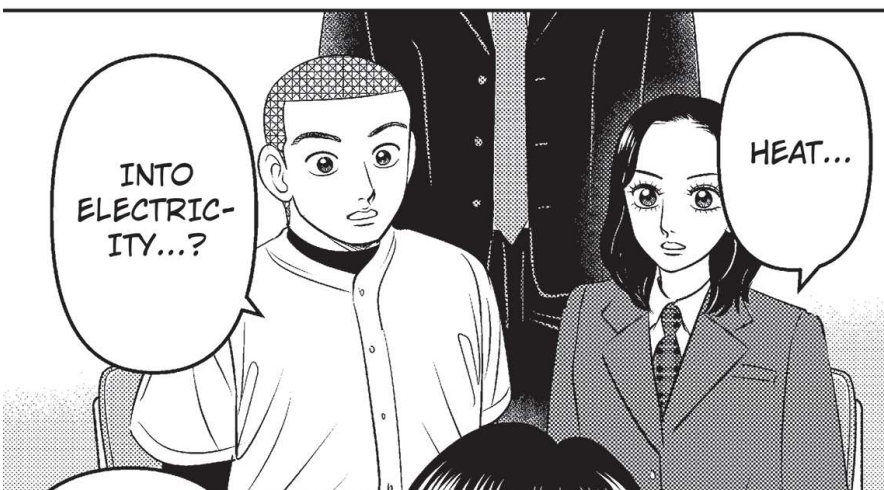
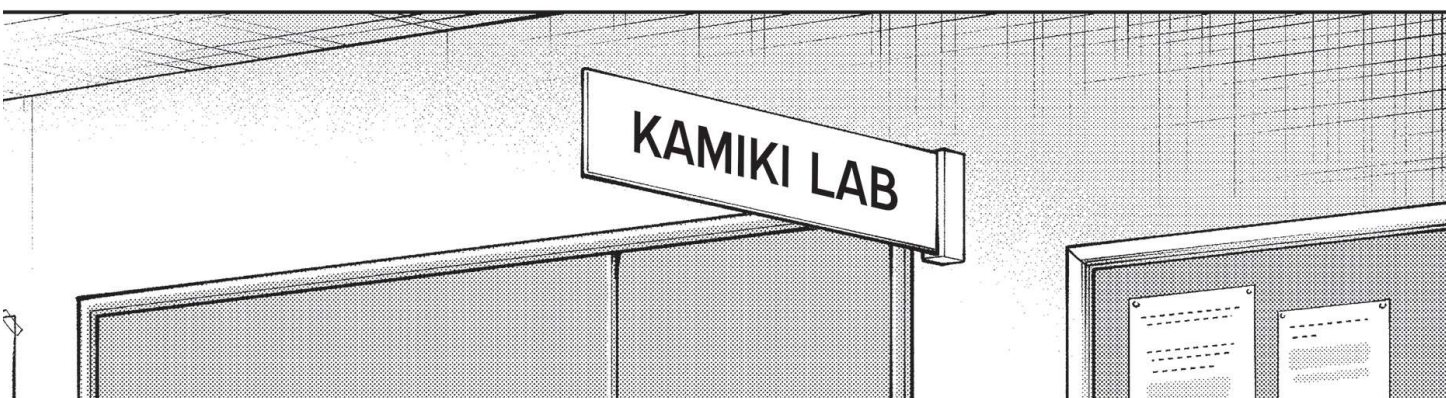
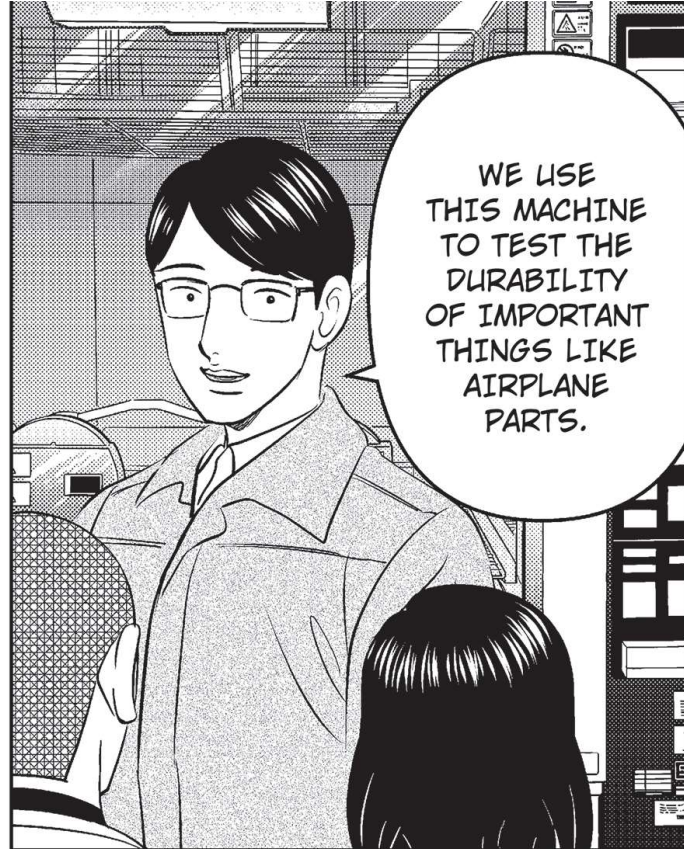


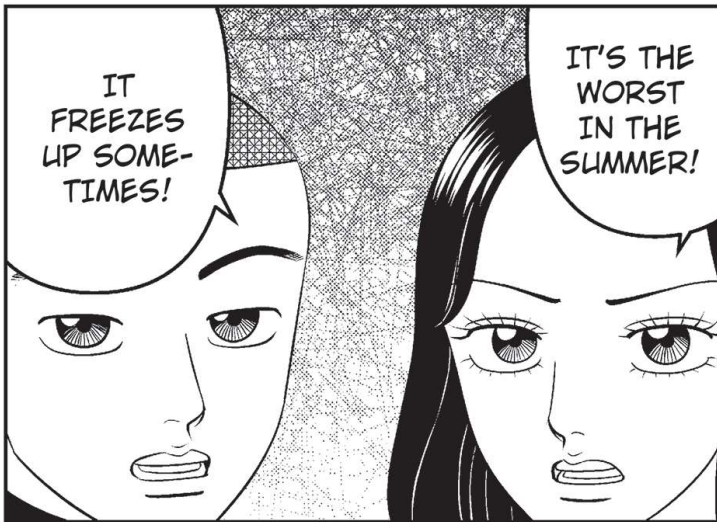
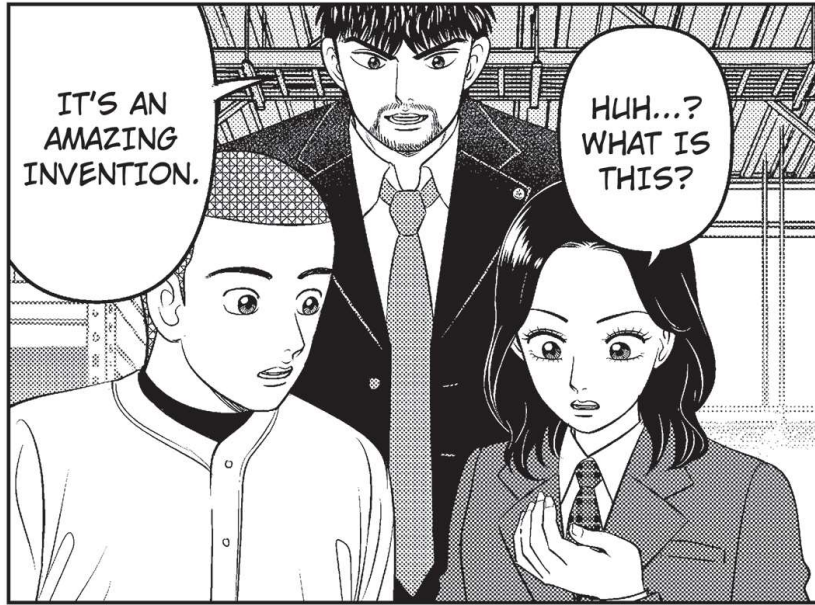
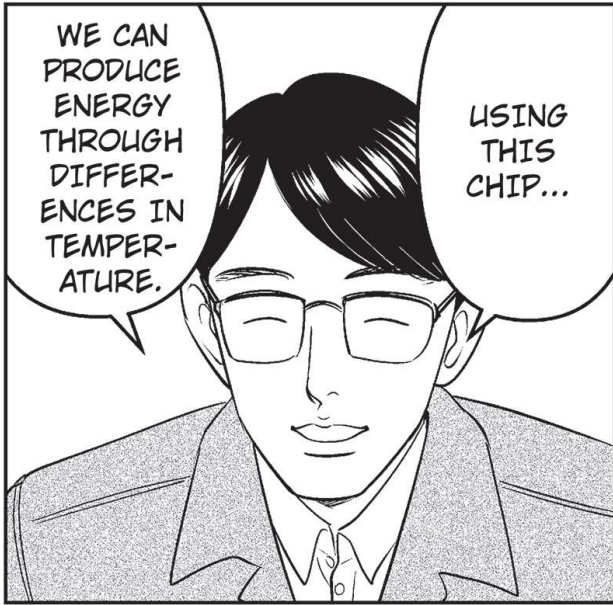
WE CAN ADJUST THE TEMPERATURE INSIDE THIS MACHINE FROM -20 TO 100 °C AND THE HUMIDITY FROM 0 TO 99%.



SUZUKI RESEARCHER

THIS DEVICE HERE CONTROLS HEAT AND HUMIDITY.







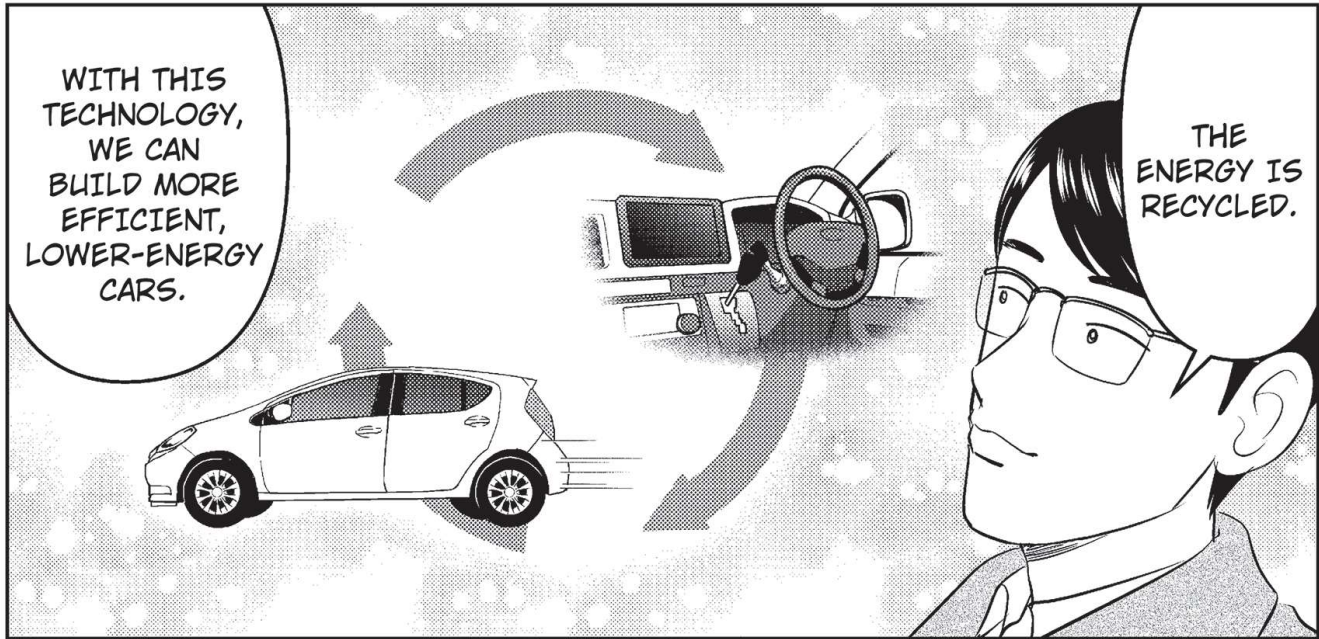
IN OTHER WORDS...

WITH THIS, YOU COULD USE THE ENGINE HEAT... TO POWER THE ELECTRONICS IN YOUR CAR.



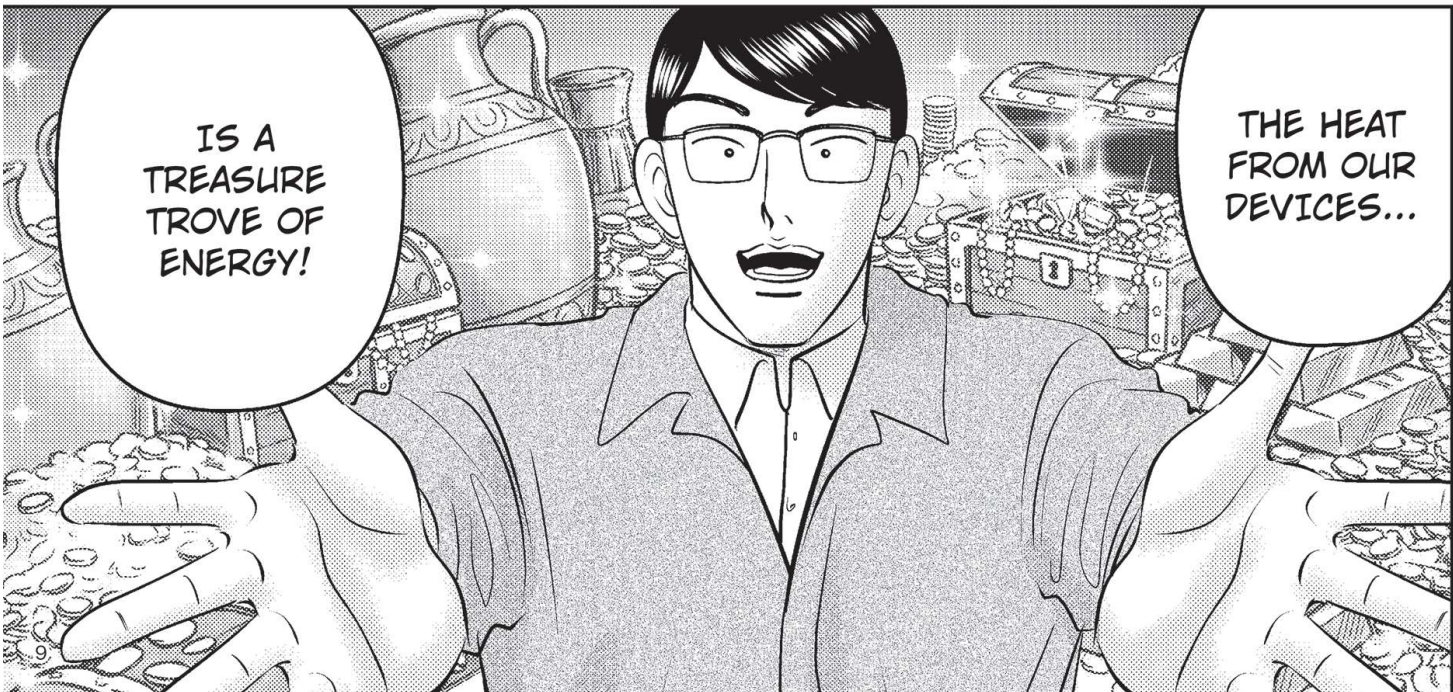
THAT'S WHERE THIS CHIP COMES IN.

FOR INSTANCE, THE LONGER YOU LEAVE YOUR CAR'S ENGINE RUNNING, THE HOTTER IT GETS.



WITH THIS TECHNOLOGY, WE CAN BUILD MORE EFFICIENT, LOWER-ENERGY CARS.

THE ENERGY IS RECYCLED.



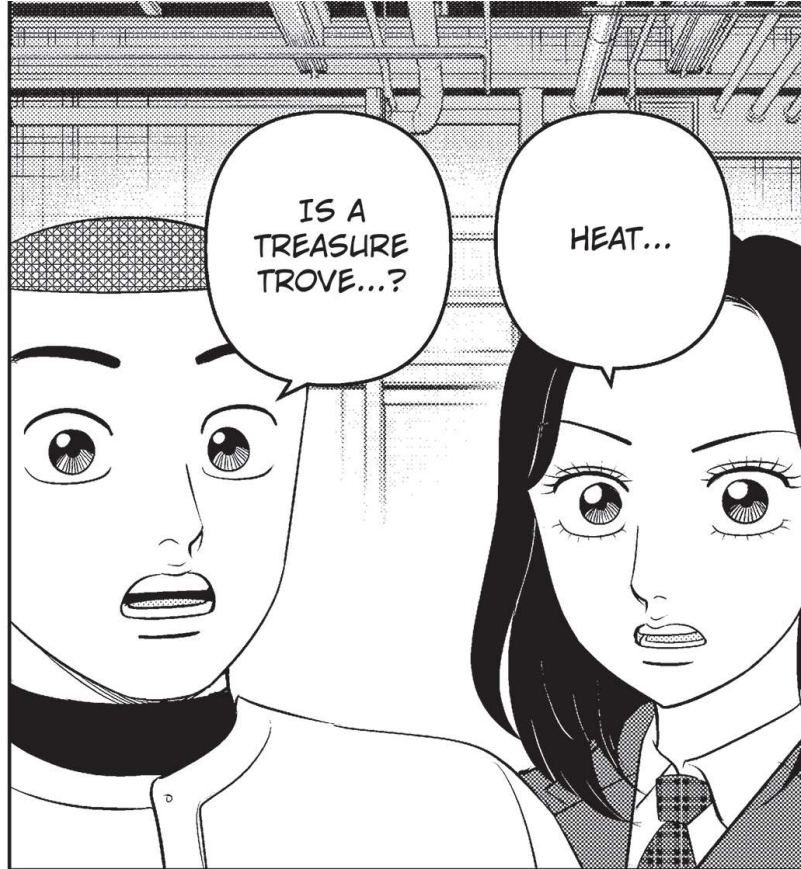
IS A TREASURE TROVE OF ENERGY!

THE HEAT FROM OUR DEVICES...



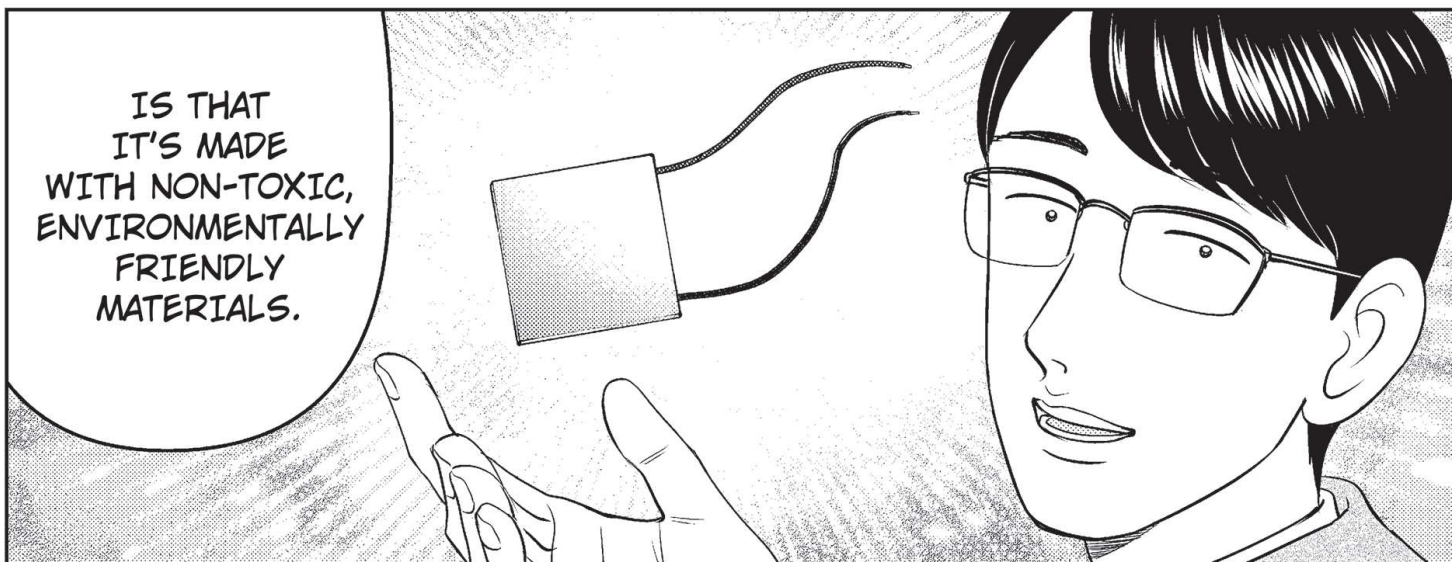
AND WHAT
MAKES THIS
NEW CHIP
EVEN MORE
GROUNDBREA
KING...

THAT'S
RIGHT!
THESE
CONTRIBU-
TIONS TO
SOCIETY
ALSO HELP
DRIVE THE
ECONOMY.



IS A
TREASURE
TROVE...?

HEAT...

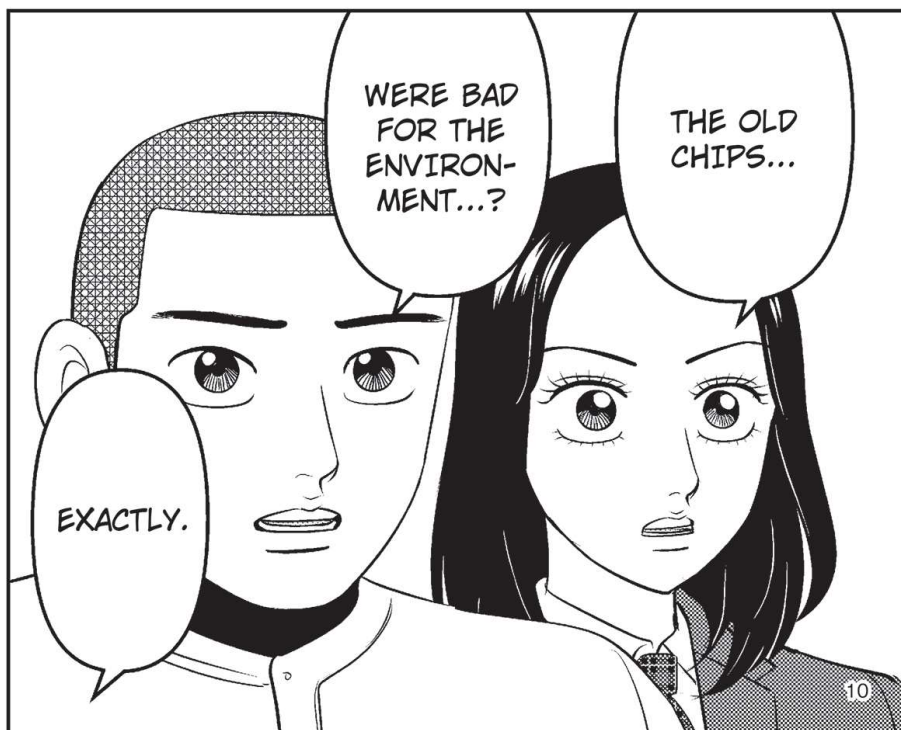


IS THAT
IT'S MADE
WITH NON-TOXIC,
ENVIRONMENTALLY
FRIENDLY
MATERIALS.



TO
FINALLY
END UP
WITH THIS
DESIGN.

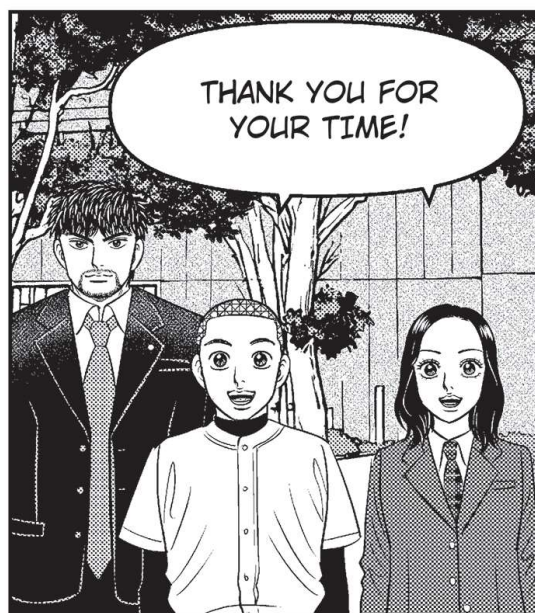
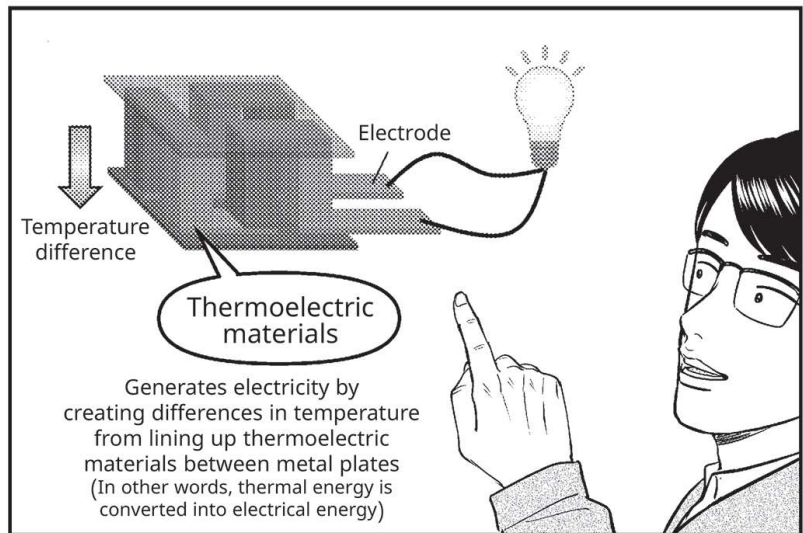
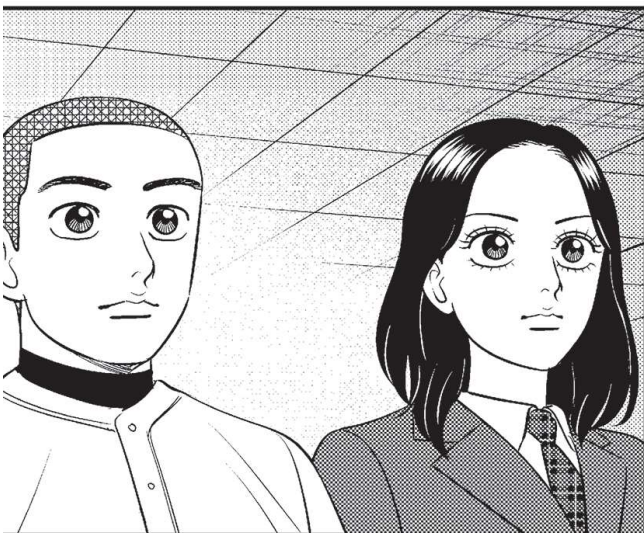
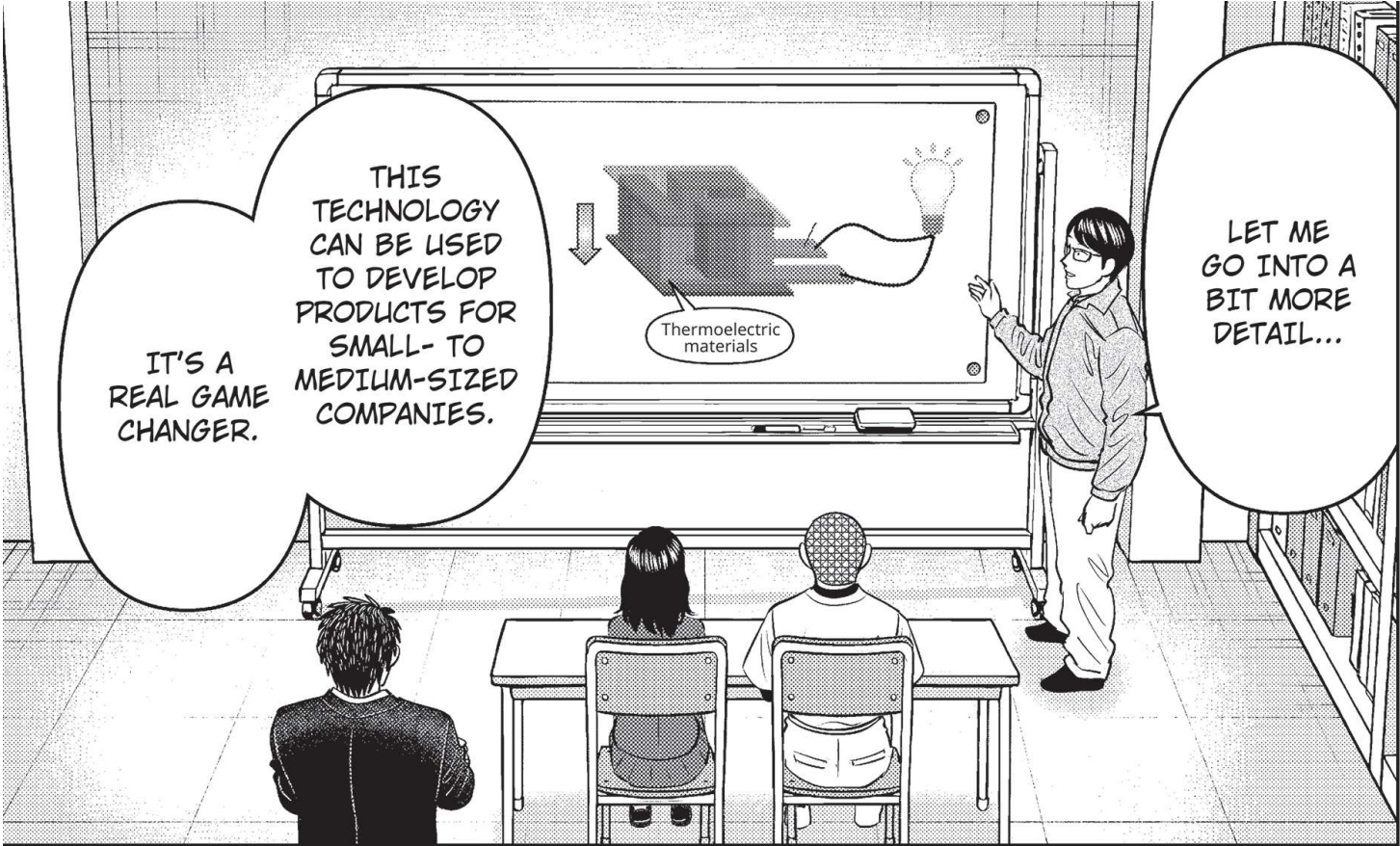
IT TOOK
MANY
ITERATIONS
OF RESEARCH
WITH DIF-
FERENT
MATERIALS
...



EXACTLY.

WERE BAD
FOR THE
ENVIRON-
MENT...?

THE OLD
CHIPS...





DO YOU TWO KNOW HOW KAMIKI MANAGED...

THESE PEOPLE ARE WORKING FOR THE FUTURE...

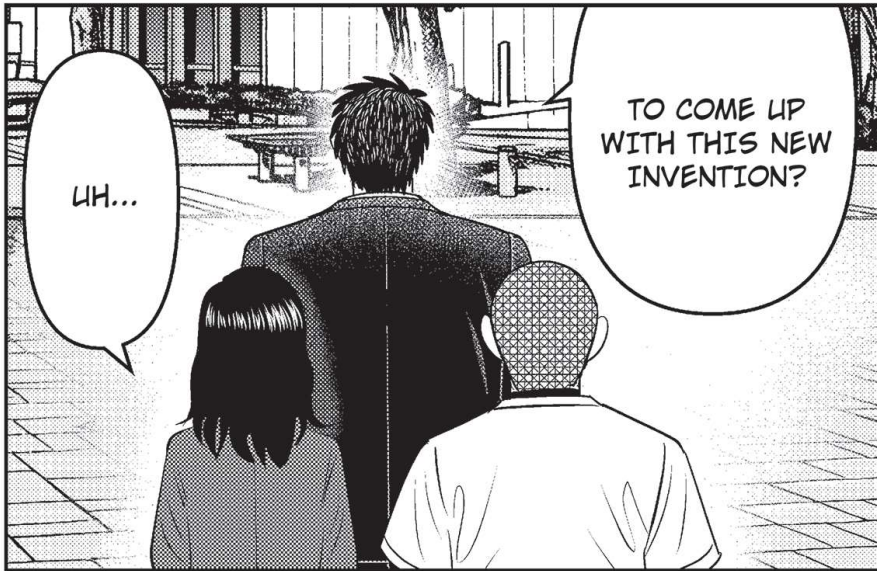
BEHIND THE SCENES...



A SUDDEN FLASH OF INSPIRATION!

MAYBE... GOOD PLANNING SKILLS?

WRONG !!



UH...

TO COME UP WITH THIS NEW INVENTION?



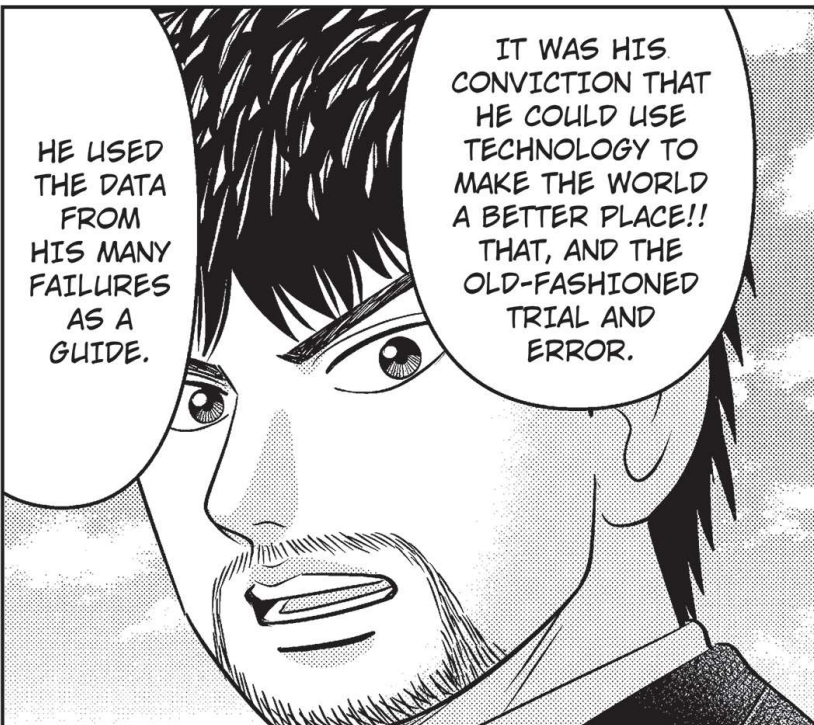
WHAT DO YOU MEAN?

YOU DON'T KNOW THE MEANING OF HARD WORK.

COME WITH ME.



UGH... YOU MEAN HARD WORK? THAT SOUNDS LIKE A LOT OF EFFORT...



HE USED THE DATA FROM HIS MANY FAILURES AS A GUIDE.

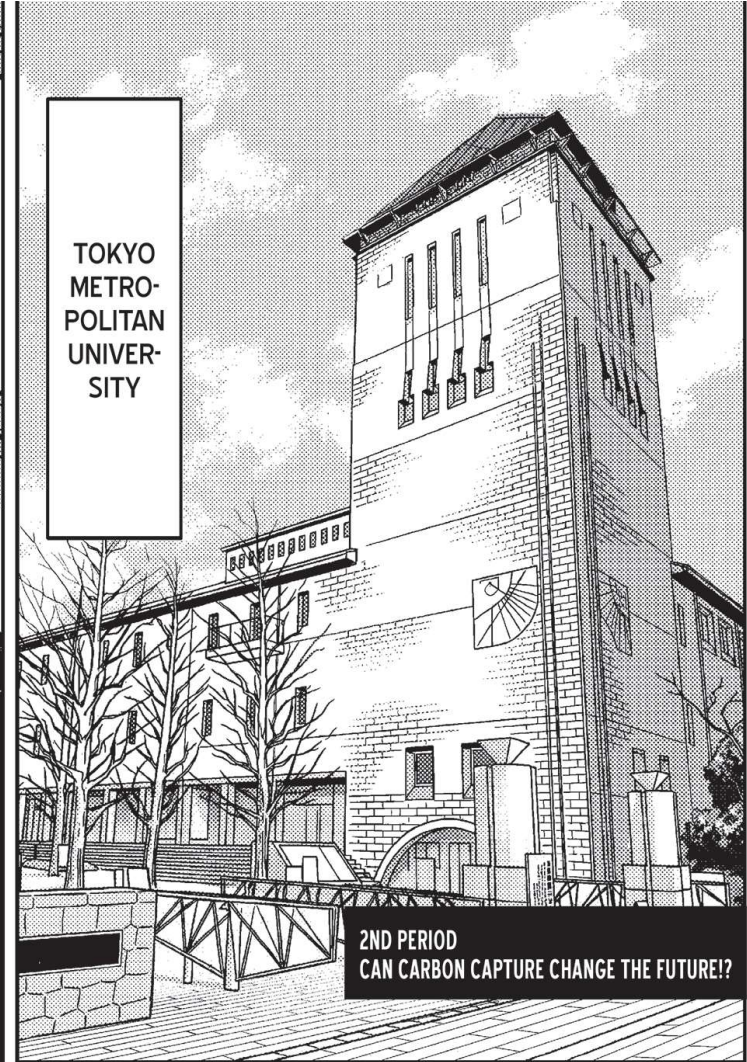
IT WAS HIS CONVICTION THAT HE COULD USE TECHNOLOGY TO MAKE THE WORLD A BETTER PLACE!! THAT, AND THE OLD-FASHIONED TRIAL AND ERROR.



THIS TIME, WE'LL BE TALKING ABOUT CARBON DIOXIDE!

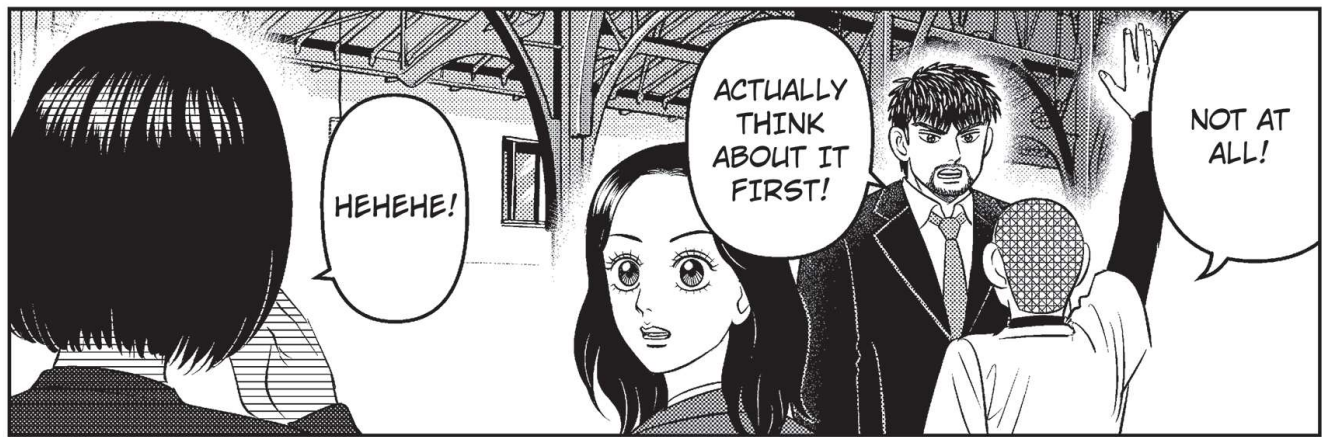
THIS IS OUR NEXT STOP.

DOES THAT BRING ANYTHING TO MIND?



TOKYO METROPOLITAN UNIVERSITY

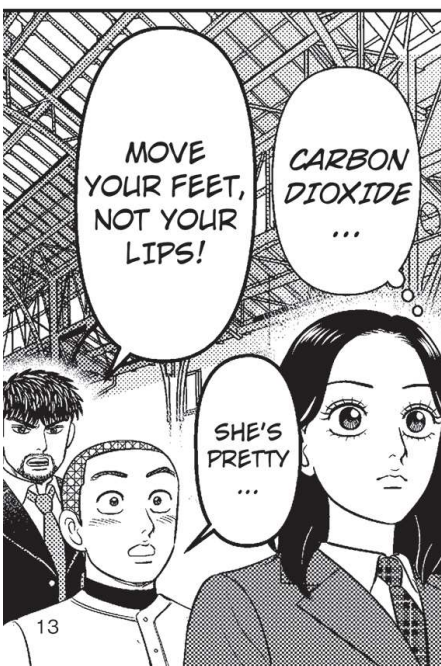
2ND PERIOD
CAN CARBON CAPTURE CHANGE THE FUTURE!?



HEHEHE!

ACTUALLY THINK ABOUT IT FIRST!

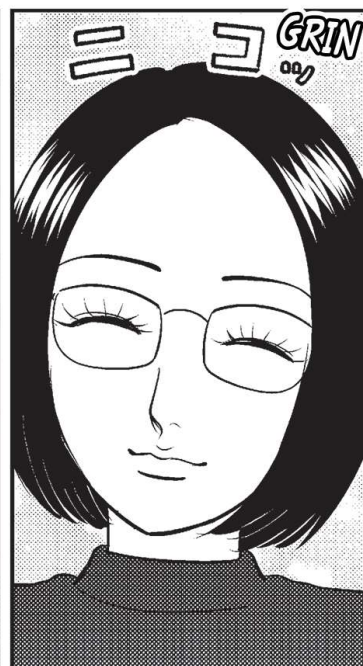
NOT AT ALL!



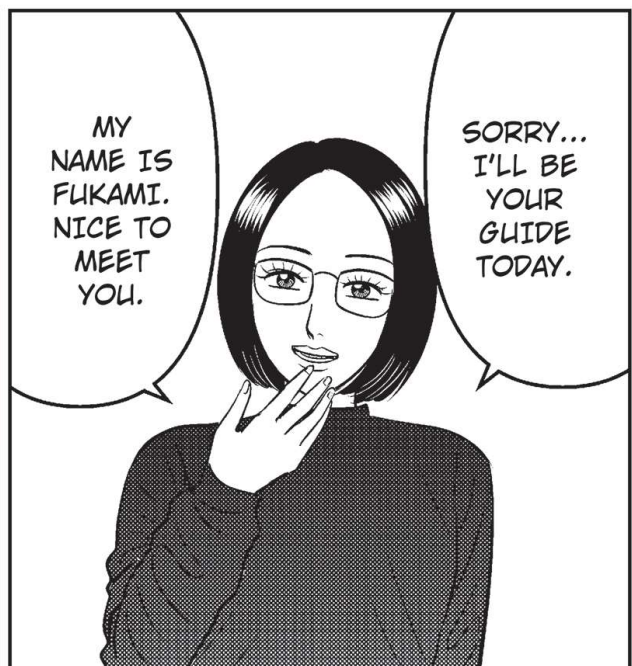
MOVE YOUR FEET, NOT YOUR LIPS!

CARBON DIOXIDE ...

SHE'S PRETTY ...



GRIN

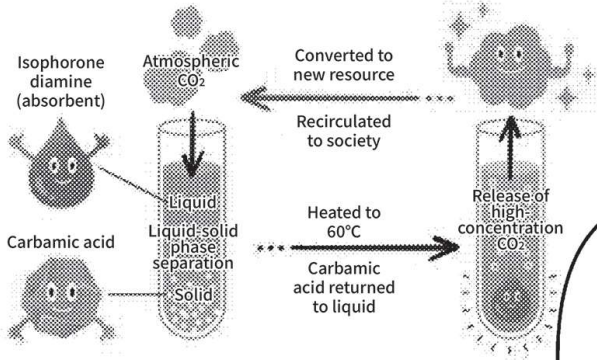


MY NAME IS FUKAMI. NICE TO MEET YOU.

SORRY... I'LL BE YOUR GUIDE TODAY.

*DAC: Direct Air Capture

DEVELOPING NEW MATERIALS FOR DAC: SUCCESSFULLY SOLIDIFYING CARBON DIOXIDE!

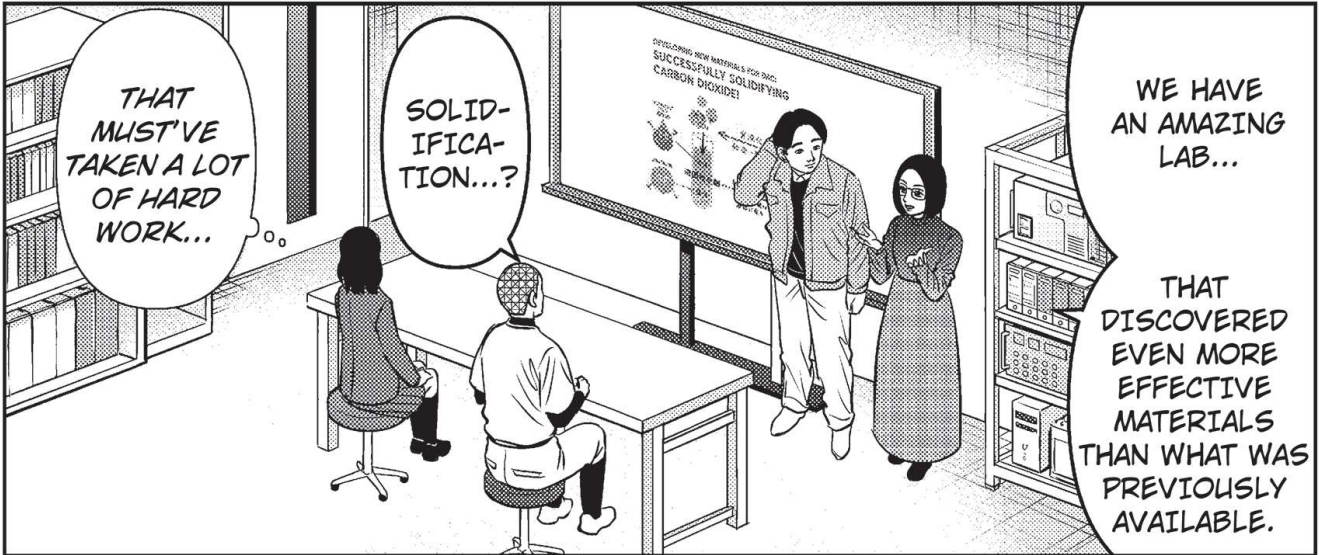


HELLO THERE.
IN THIS LAB,
WE'RE
RESEARCHING
DAC* DEVICES...

DR.
YAMAZOE

THAT CAN
CAPTURE
CARBON
DIOXIDE
IN THE
ATMOSPHERE.

Image source: "Research and Development of Passive DAC Technologies", New Energy and Industrial Technology Development Organization (NEDO)





THE DUMB ONES HERE ARE YOU!

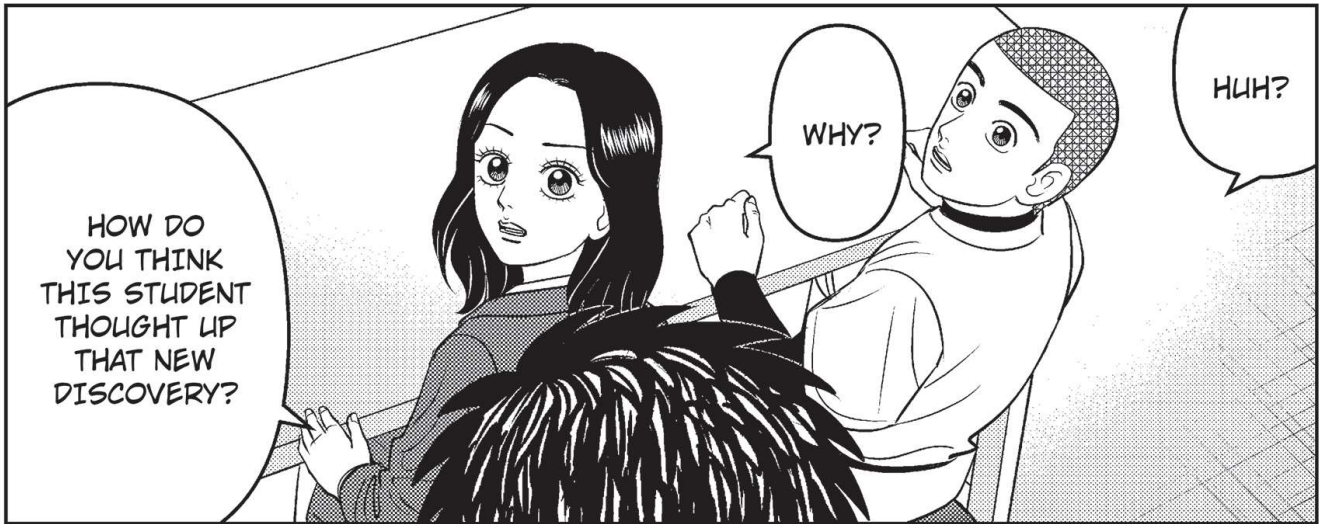
THAT'S JUST DUMB LUCK, ISN'T IT!?

SO SOMEONE ELSE DID ALL THE WORK...?



A STUDENT DOING RESEARCH ON SOMETHING ELSE BROUGHT THIS OVER AS A POTENTIAL WAY TO MAKE THE CARBON SOLIDIFY EASIER.

IT WAS FOUND BY COMPLETE COINCIDENCE.



HOW DO YOU THINK THIS STUDENT THOUGHT UP THAT NEW DISCOVERY?

WHY?

HUH?



FOR THIS DISCOVERY...

LISTEN. THE REASON...

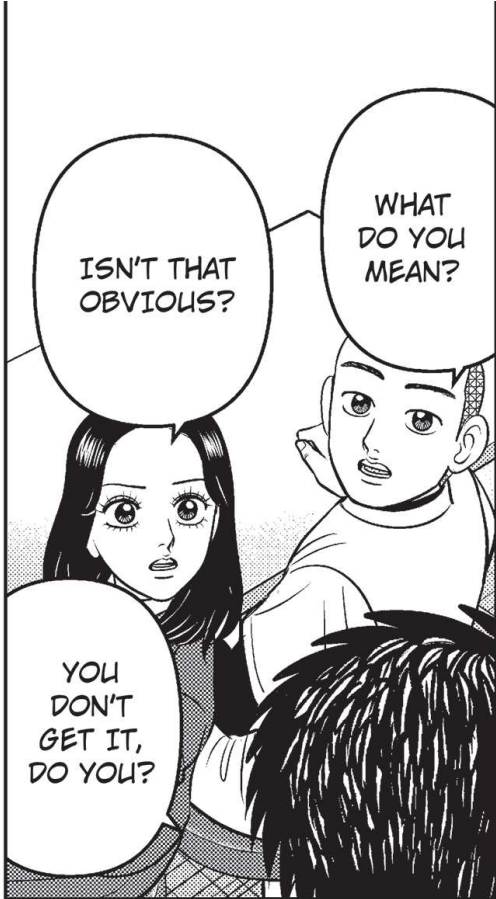


YOU'RE CLOSE, RINA.

AND YOU'RE NOT EVEN IN THE BALLPARK, YUGO.

...BECAUSE THEY WORKED HARD?

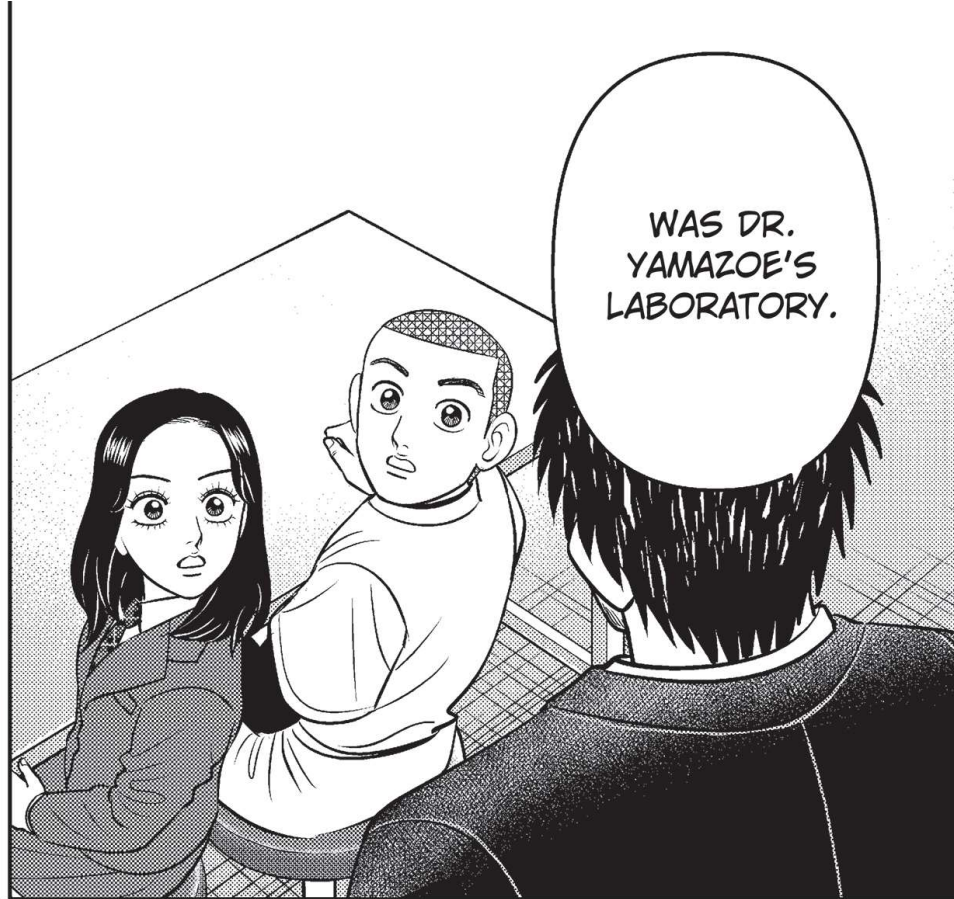
BECAUSE THEY'RE A GENIUS?



ISN'T THAT OBVIOUS?

WHAT DO YOU MEAN?

YOU DON'T GET IT, DO YOU?



WAS DR. YAMAZOE'S LABORATORY.



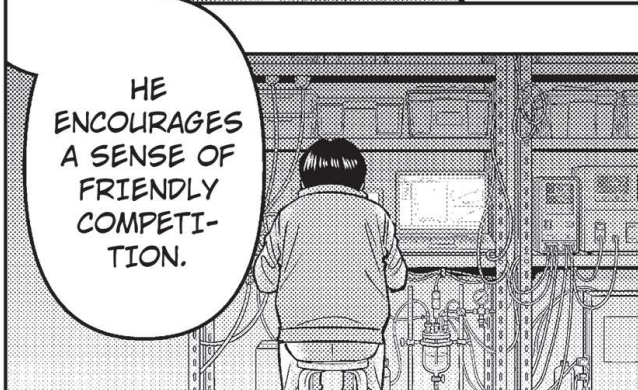
ARE THE ONES WHO CONTINUE TO MAKE THE OBVIOUS, OBVIOUS!

THE ONES WHO SHAPE THE FUTURE...

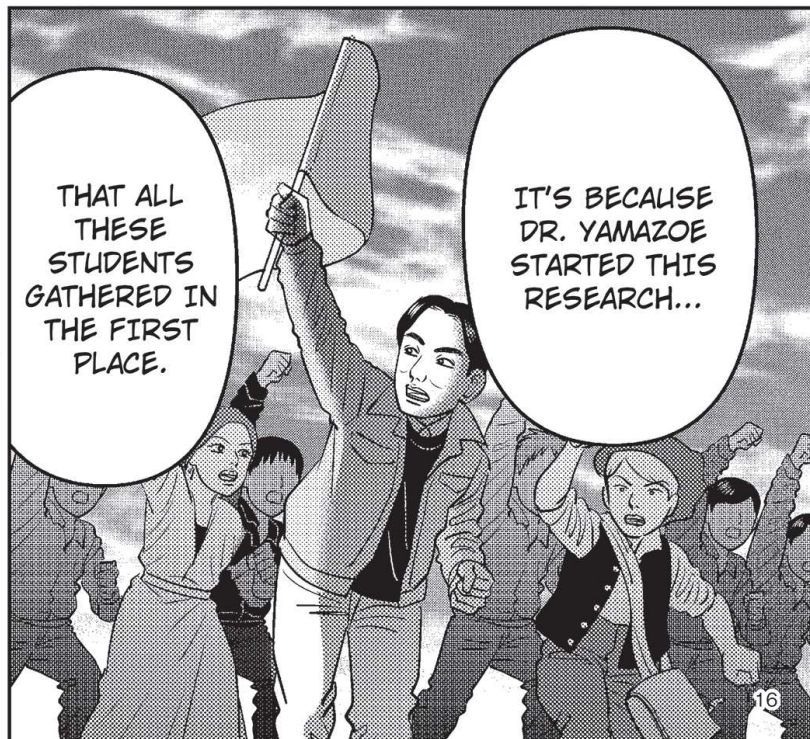


AND LEADING BY EXAMPLE ...

BY PROVIDING THEM WITH A PLACE WHERE THEY CAN FREELY CONDUCT THEIR RESEARCH...



HE ENCOURAGES A SENSE OF FRIENDLY COMPETITION.



THAT ALL THESE STUDENTS GATHERED IN THE FIRST PLACE.

IT'S BECAUSE DR. YAMAZOE STARTED THIS RESEARCH...



THEY ENDED UP... WITH A BRAND-NEW DISCOVERY!

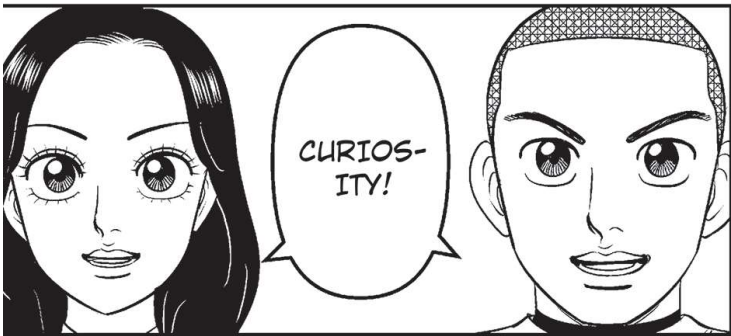
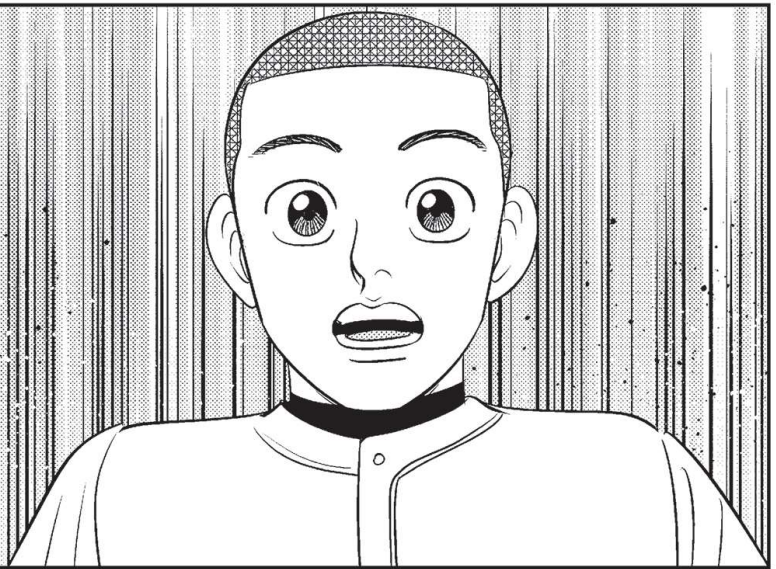
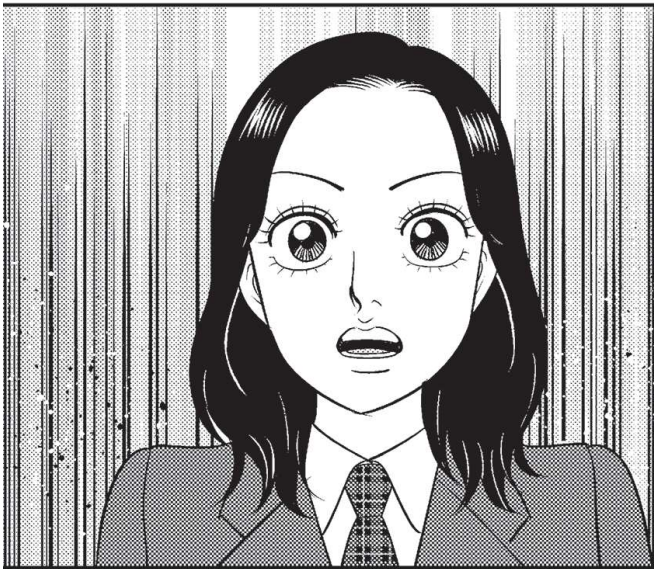
AND PERSISTENT EFFORT...

THROUGH THEIR INTENSE RE-SEARCH ...



THAT'S WHAT MAKES THIS PLACE AMAZING.

IT'S A WHIRLWIND OF CURIOSITY.



CURIOSITY!



IT'S...

IN OTHER WORDS...

NOW DO YOU UNDERSTAND THE TRUE MEANING OF HARD WORK?



HEH!

GRIN



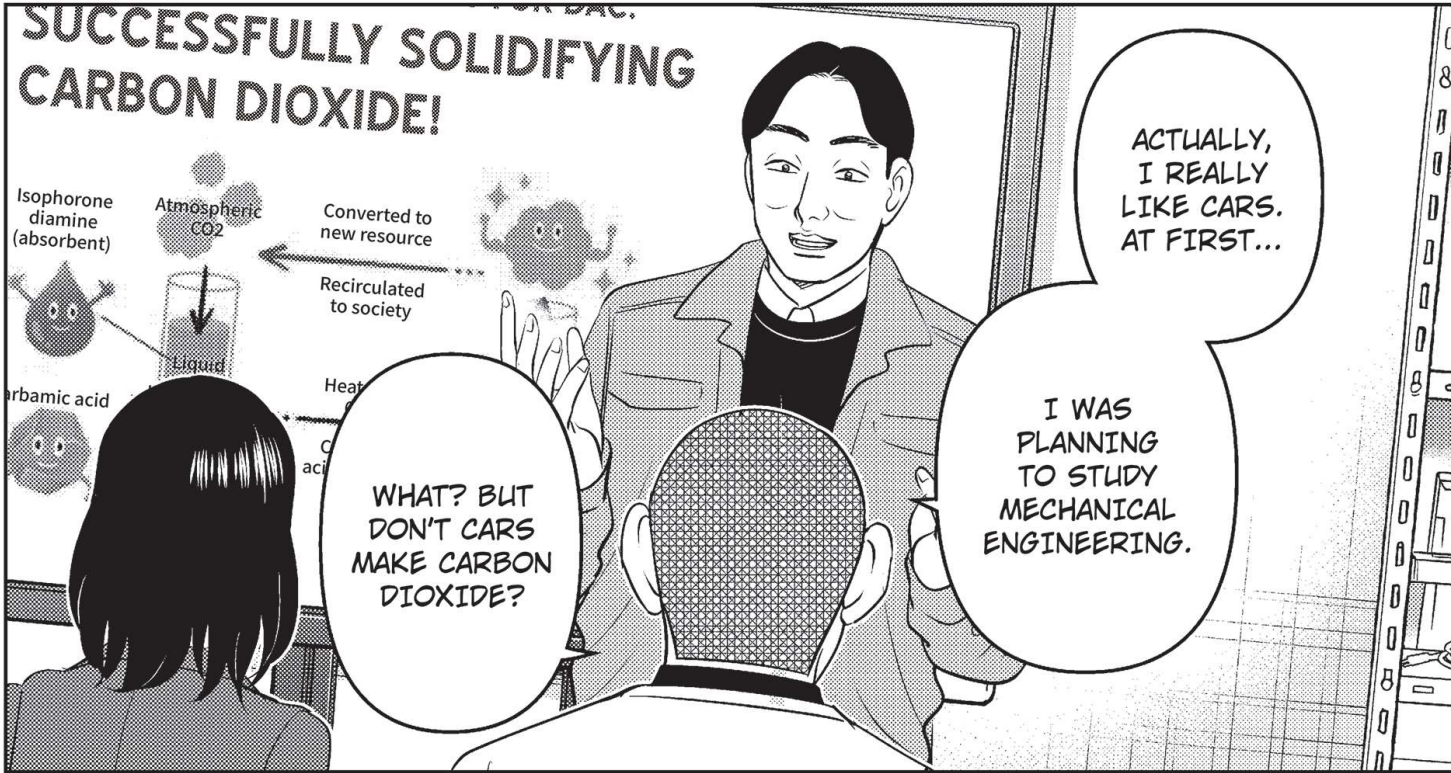
HAHA-HA!

YOU REALLY LIKE CARBON DIOXIDE, DR. YAMAZOE?

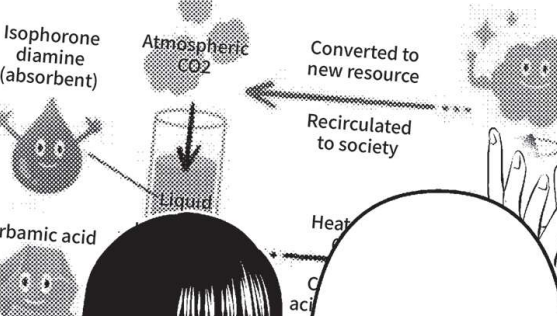


DOES THAT MEAN...

WAIT A SECOND.



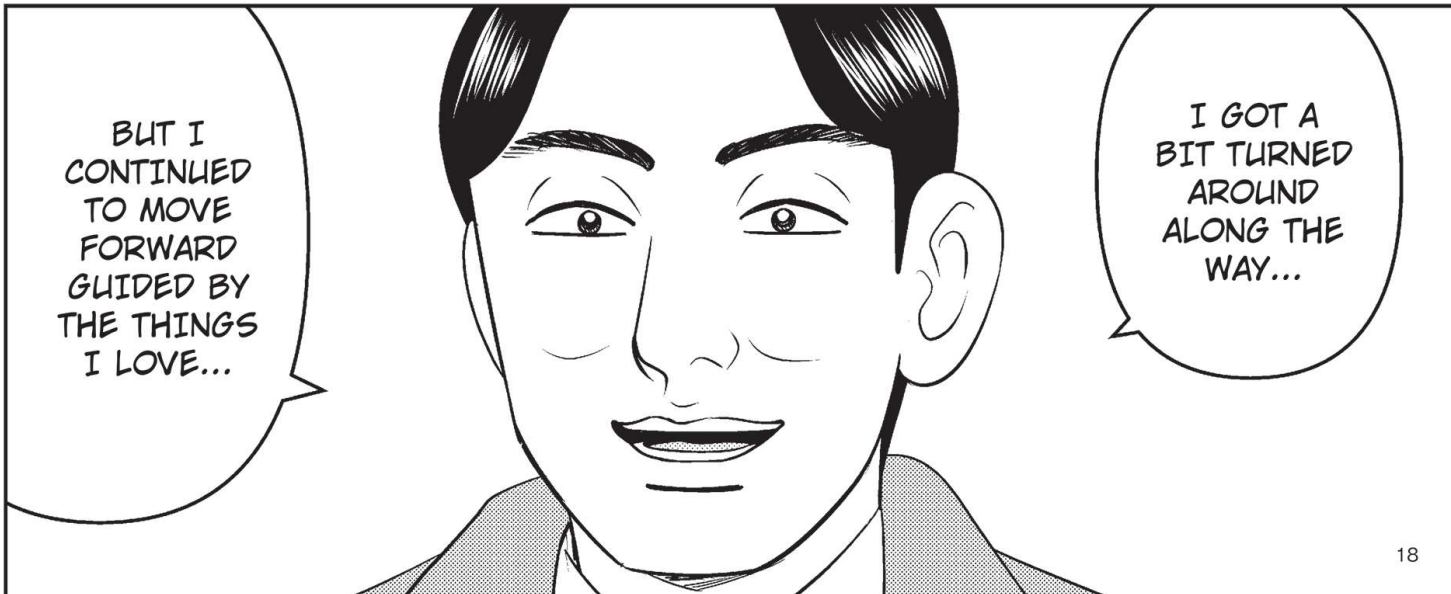
SUCCESSFULLY SOLIDIFYING CARBON DIOXIDE!



ACTUALLY, I REALLY LIKE CARS. AT FIRST...

WHAT? BUT DON'T CARS MAKE CARBON DIOXIDE?

I WAS PLANNING TO STUDY MECHANICAL ENGINEERING.



BUT I CONTINUED TO MOVE FORWARD GUIDED BY THE THINGS I LOVE...

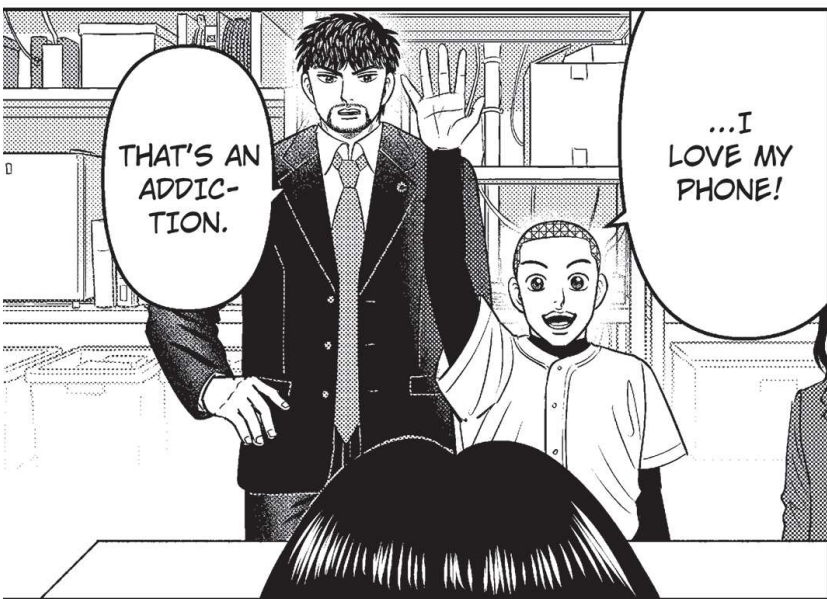
I GOT A BIT TURNED AROUND ALONG THE WAY...



AND NOW...
THANKS TO THAT
PASSION FOR
OUR WORK,
WE WERE ABLE
TO COME UP
WITH A NEW
DISCOVERY!

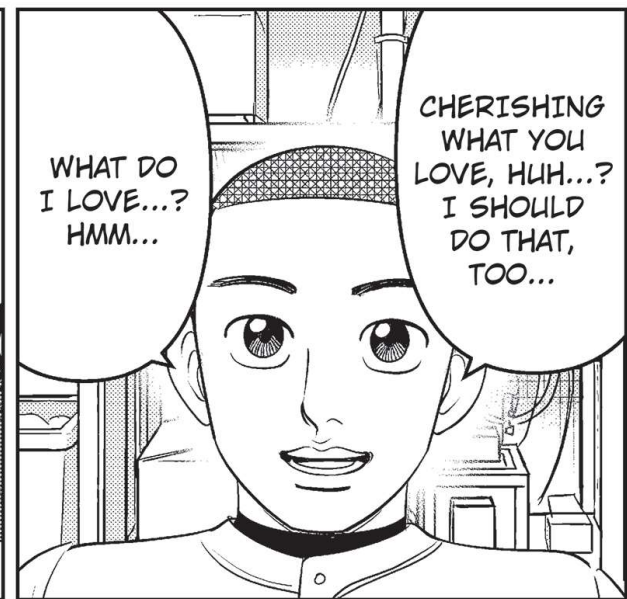
AND SOON I
FOUND MYSELF
SURROUNDED
BY PEOPLE...

WHO
CHERISH
WHAT THEY
LOVE AS
MUCH AS
I DO.



THAT'S AN
ADDIC-
TION.

...I
LOVE MY
PHONE!



WHAT DO
I LOVE...?
HMM...

CHERISHING
WHAT YOU
LOVE, HUH...?
I SHOULD
DO THAT,
TOO...



HEHE.

ARE YOU
TALKING
ABOUT
ME...!?

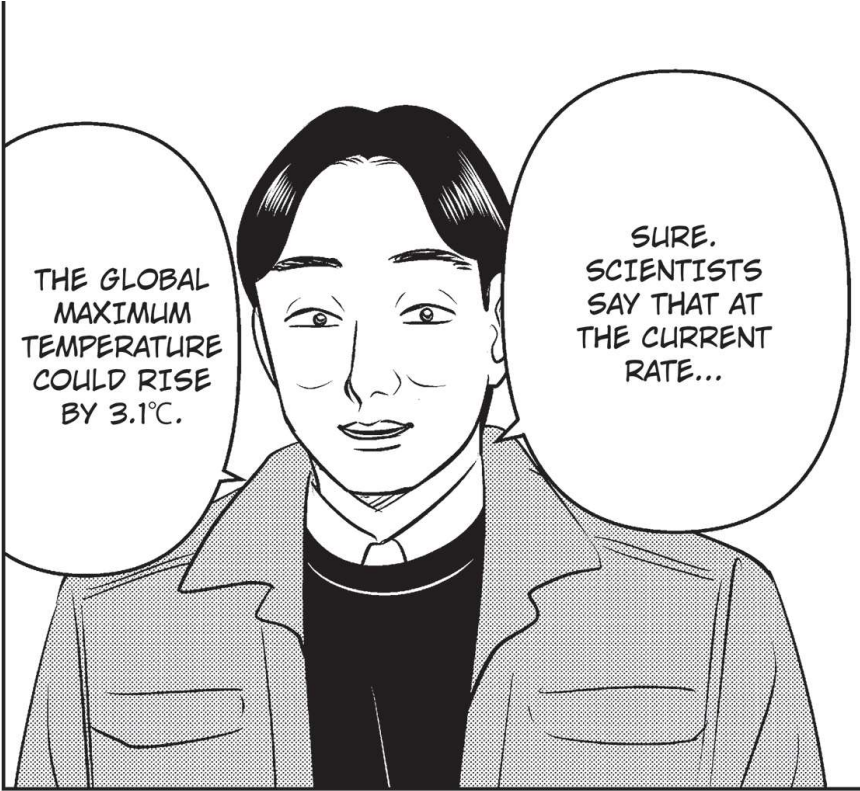
ABOUT
WHAT'LL
HAPPEN IF
GLOBAL
WARMING
CONTINUES?

BY THE
WAY,
COULD YOU
ENLIGHTEN
THESE
THEM...



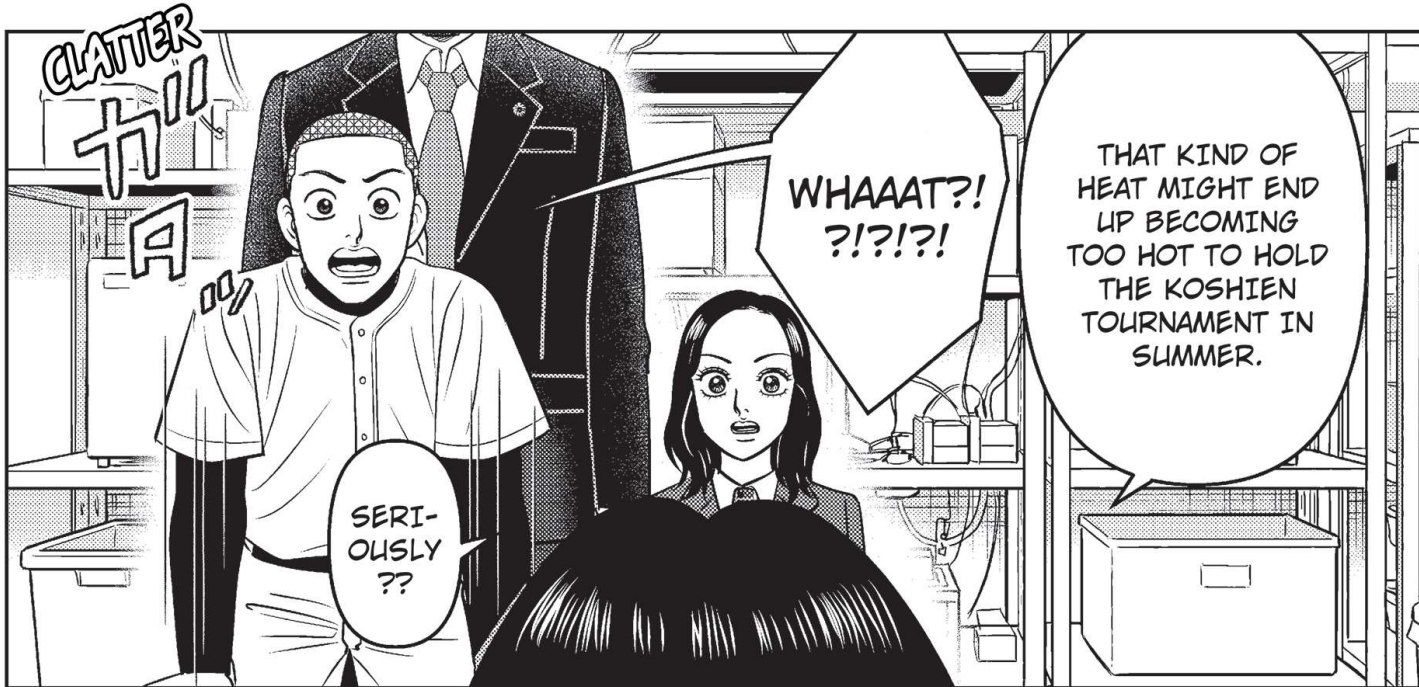
YOU DUNCE!

THAT'S ALL? THAT DOESN'T SEEM LIKE A LOT.



THE GLOBAL MAXIMUM TEMPERATURE COULD RISE BY 3.1°C.

SURE. SCIENTISTS SAY THAT AT THE CURRENT RATE...



CLATTER
+
A

SERIOUSLY??

WHAAAT?!
?!?!?!

THAT KIND OF HEAT MIGHT END UP BECOMING TOO HOT TO HOLD THE KOSHUEN TOURNAMENT IN SUMMER.



INHALE

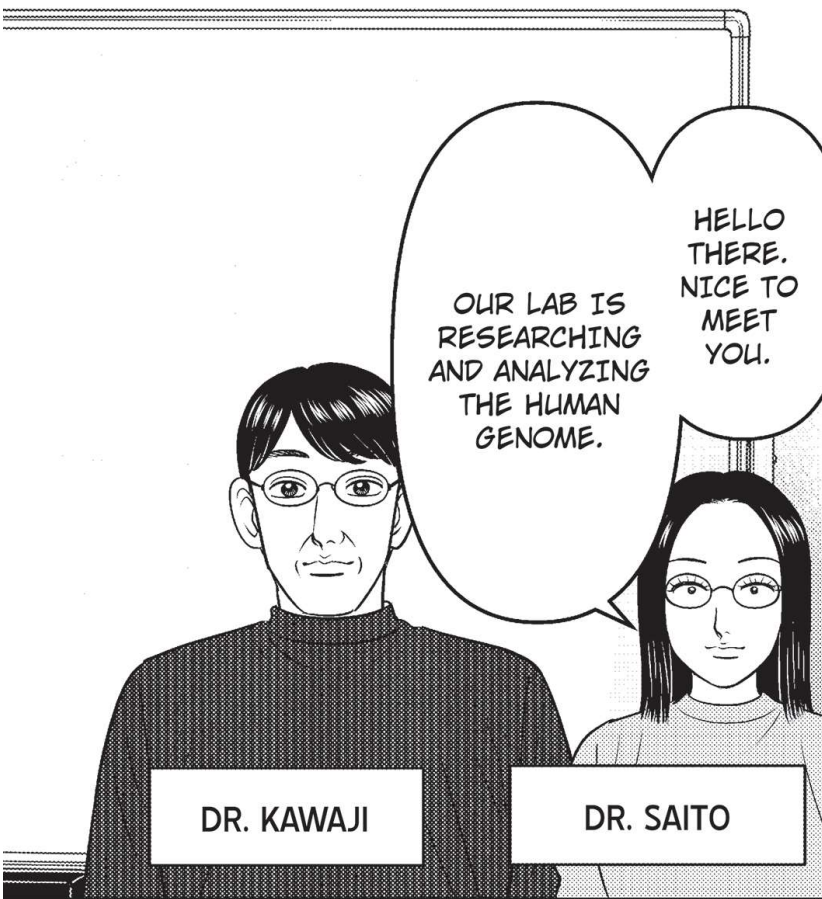
I'M GONNA CAPTURE ALL THE CARBON DIOXIDE I CAN!!

MEAT-HEAD.



A-... ALRIGHT. I'VE DECIDED...

PLEASE! ANYTHING BUT THAT!!

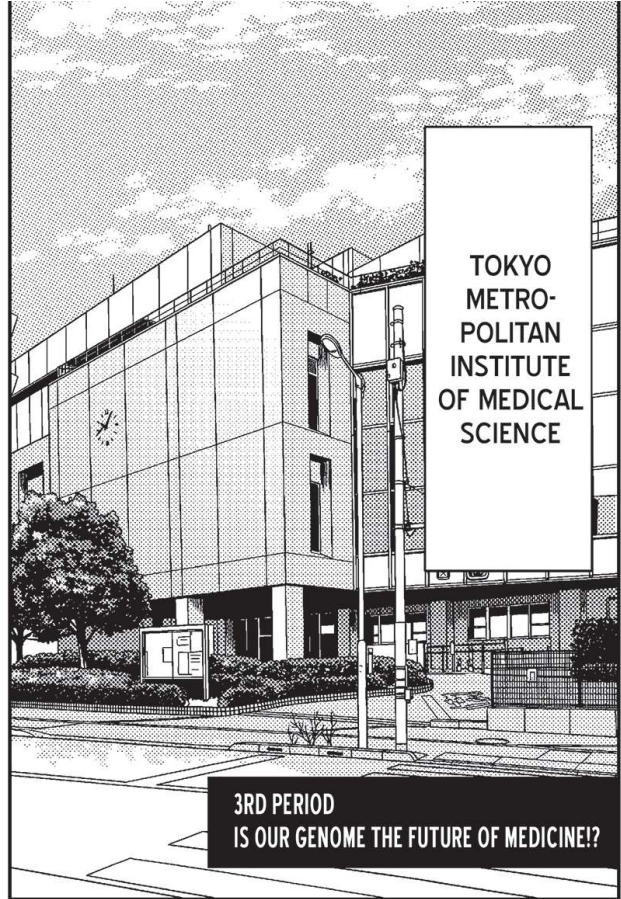


OUR LAB IS RESEARCHING AND ANALYZING THE HUMAN GENOME.

HELLO THERE. NICE TO MEET YOU.

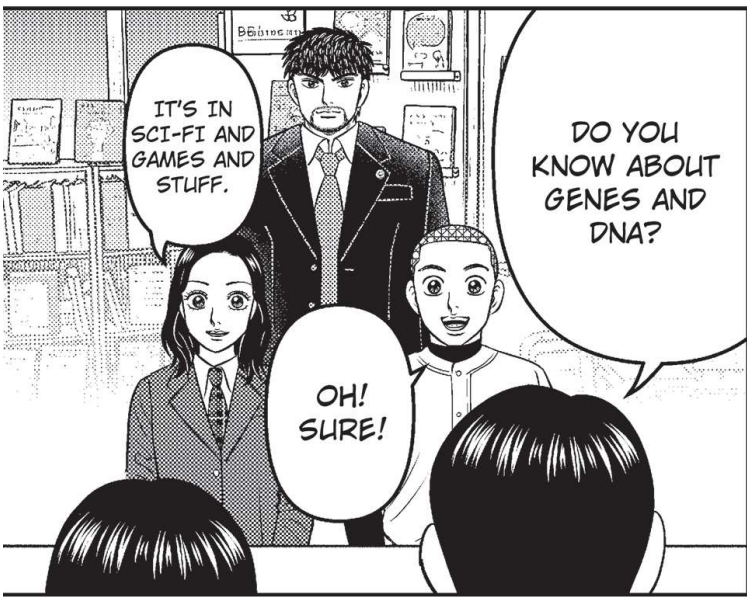
DR. KAWAJI

DR. SAITO



TOKYO METROPOLITAN INSTITUTE OF MEDICAL SCIENCE

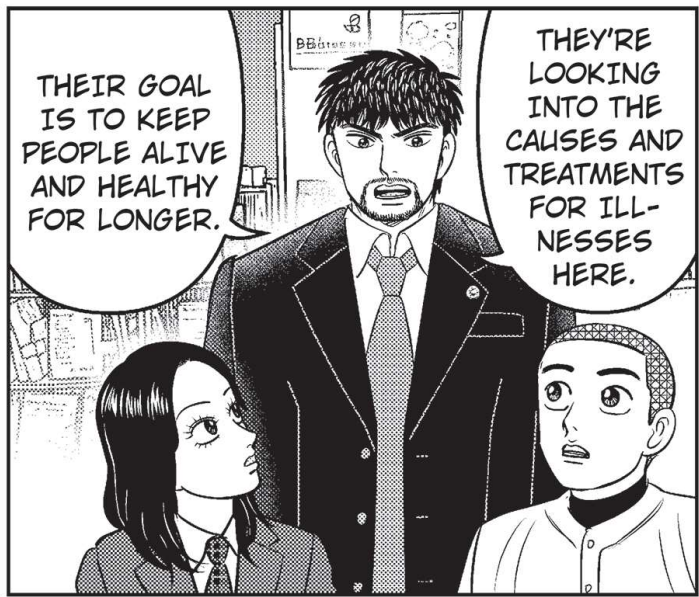
3RD PERIOD
IS OUR GENOME THE FUTURE OF MEDICINE!?



IT'S IN SCI-FI AND GAMES AND STUFF.

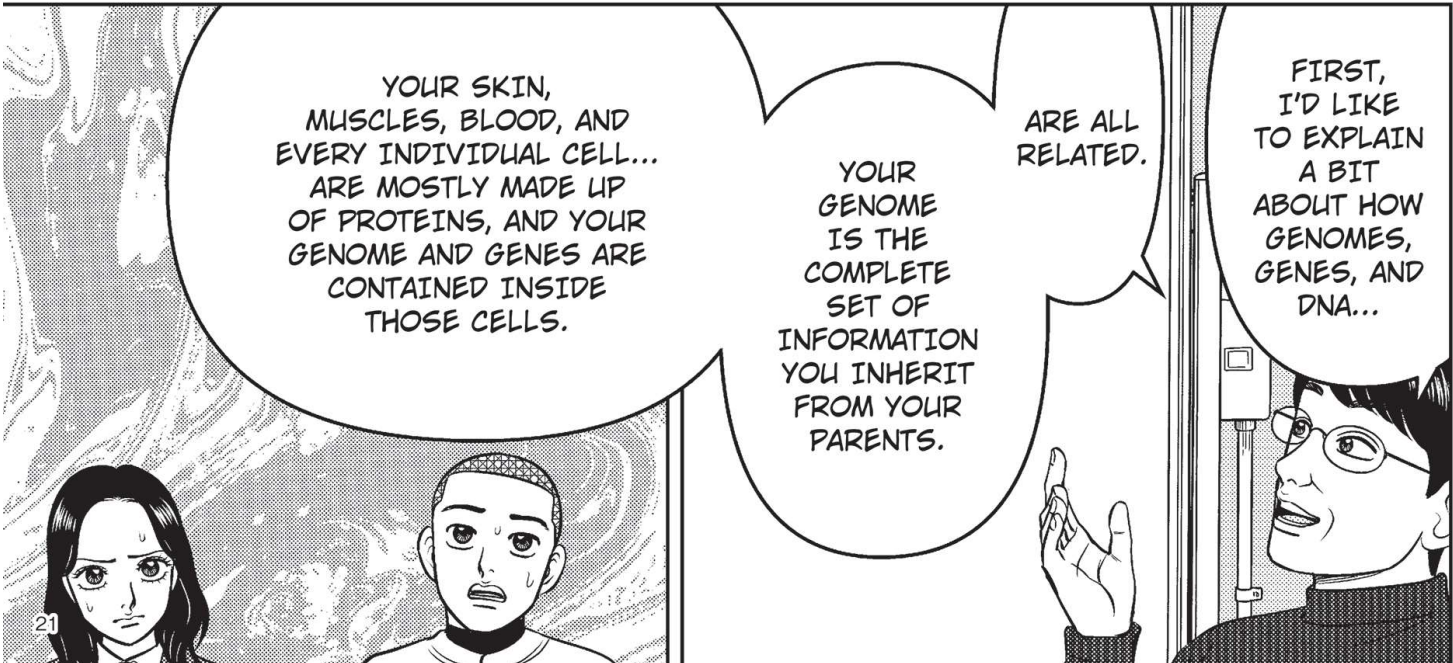
OH! SURE!

DO YOU KNOW ABOUT GENES AND DNA?



THEIR GOAL IS TO KEEP PEOPLE ALIVE AND HEALTHY FOR LONGER.

THEY'RE LOOKING INTO THE CAUSES AND TREATMENTS FOR ILLNESSES HERE.



YOUR SKIN, MUSCLES, BLOOD, AND EVERY INDIVIDUAL CELL... ARE MOSTLY MADE UP OF PROTEINS, AND YOUR GENOME AND GENES ARE CONTAINED INSIDE THOSE CELLS.

YOUR GENOME IS THE COMPLETE SET OF INFORMATION YOU INHERIT FROM YOUR PARENTS.

ARE ALL RELATED.

FIRST, I'D LIKE TO EXPLAIN A BIT ABOUT HOW GENOMES, GENES, AND DNA...



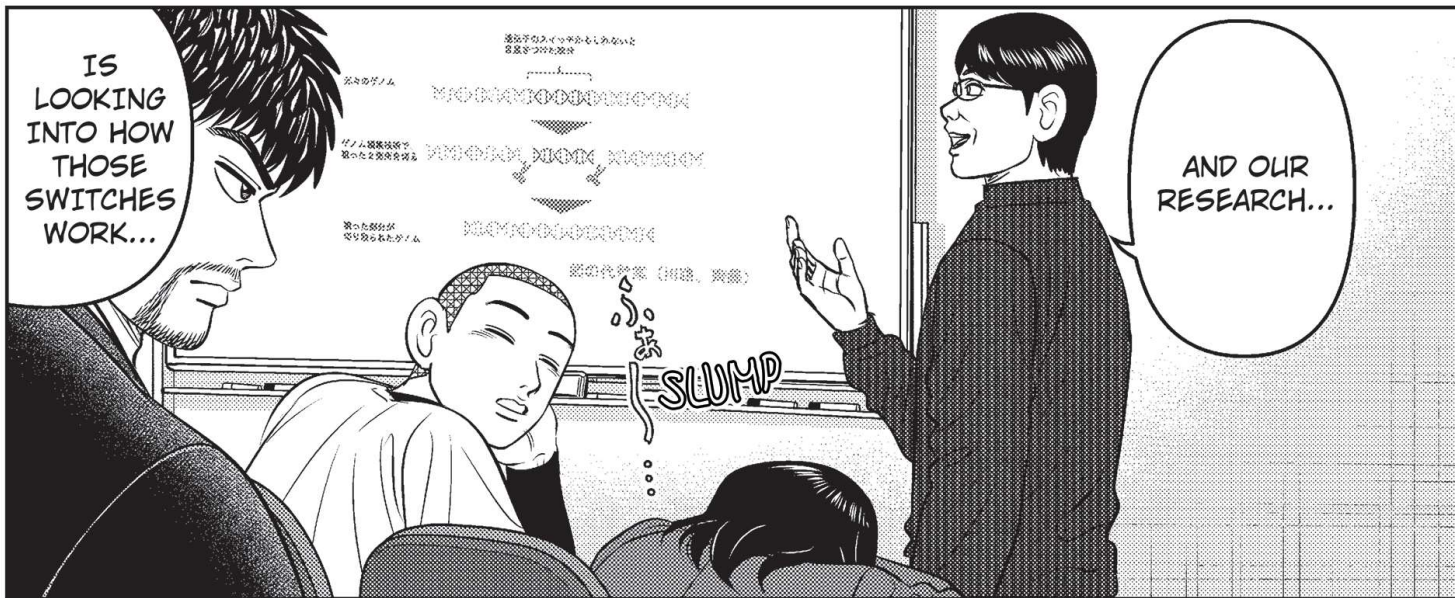
YOUR GENOME ALSO CONTAINS THE SWITCHES THAT CONTROL WHEN AND HOW MUCH OF ALL THOSE PROTEINS TO MAKE...

NOD
NOD
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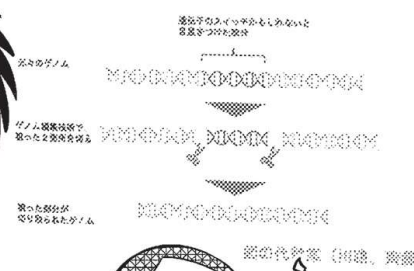


AND WITHIN... ARE PARTS WITH INSTRUCTIONS TO MAKE THE PROTEINS IN YOUR BODY. THOSE ARE YOUR GENES.

YOUR GENOME IS COMPOSED OF ABOUT THREE BILLION A, T, G, AND C NUCLEOTIDES THAT MAKE UP YOUR DNA.



IS LOOKING INTO HOW THOSE SWITCHES WORK...



SLUMP

AND OUR RESEARCH...



A BIT MORE SIMPLY ... SO TO EXPLAIN IT...

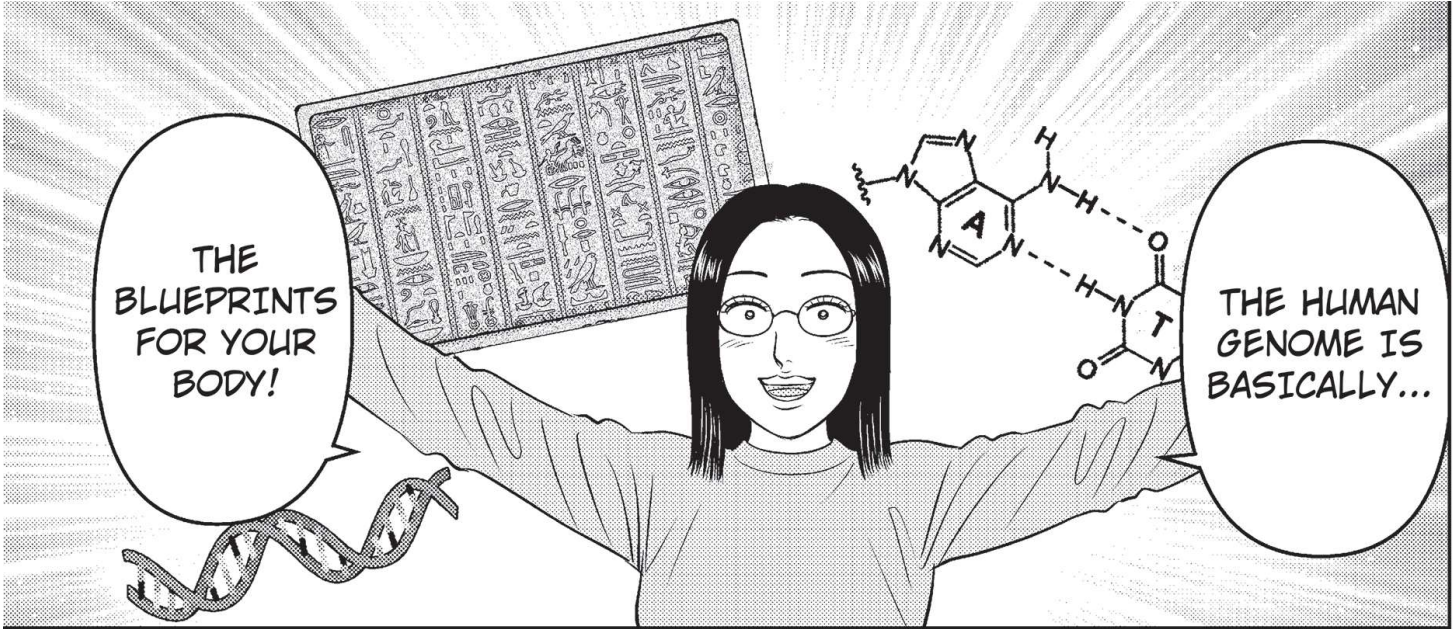


IT'S COMPLICATED, RIGHT?

HEHEHE. SORRY.

HEY!!! WAKE UP!!!!

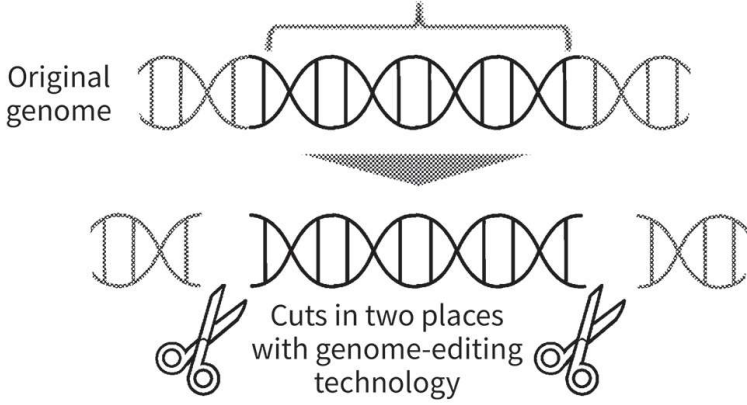
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THE BLUEPRINTS FOR YOUR BODY!

THE HUMAN GENOME IS BASICALLY...

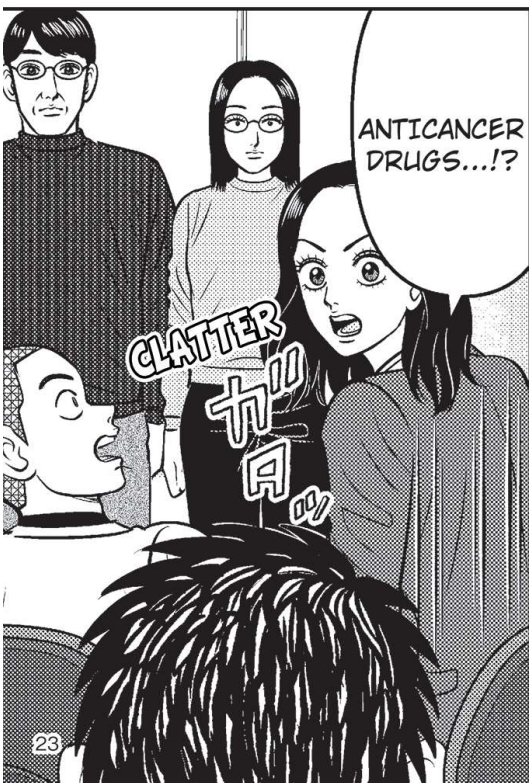
Possible on/off switch for your genes



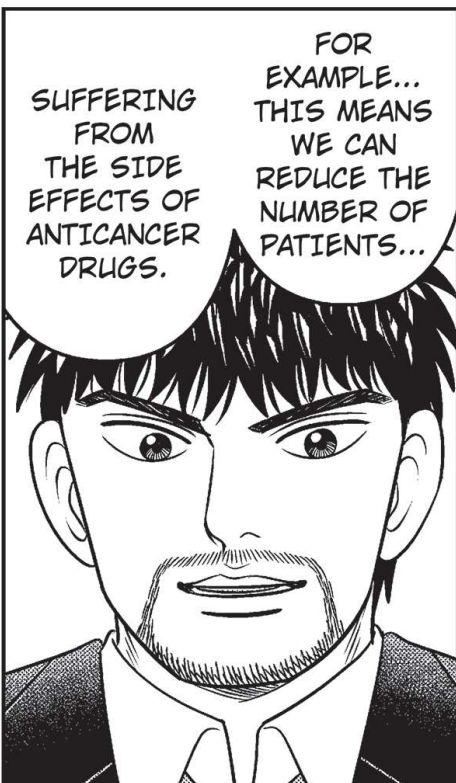
We target and cut out regions from the three billion-base DNA sequence that may switch on and off genes, and observe the cells' responses.

THAT'S WHAT WE'RE RESEARCHING.

AND INTERPRETING THESE BLUEPRINTS CAN ALLOW US TO BETTER PREDICT DRUG SIDE EFFECTS.

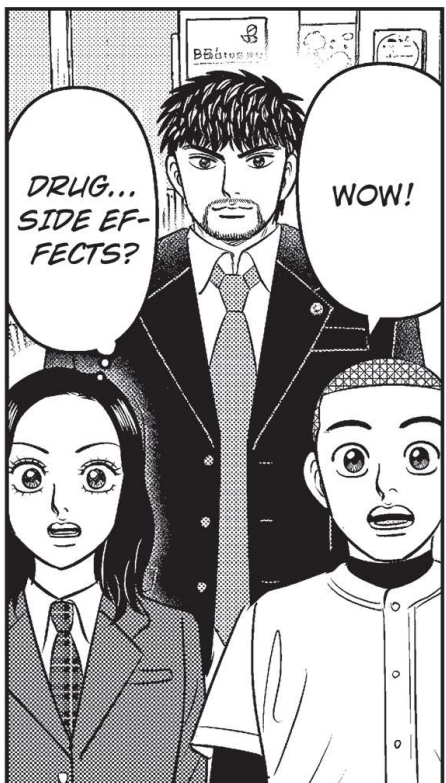


ANTICANCER DRUGS...!?



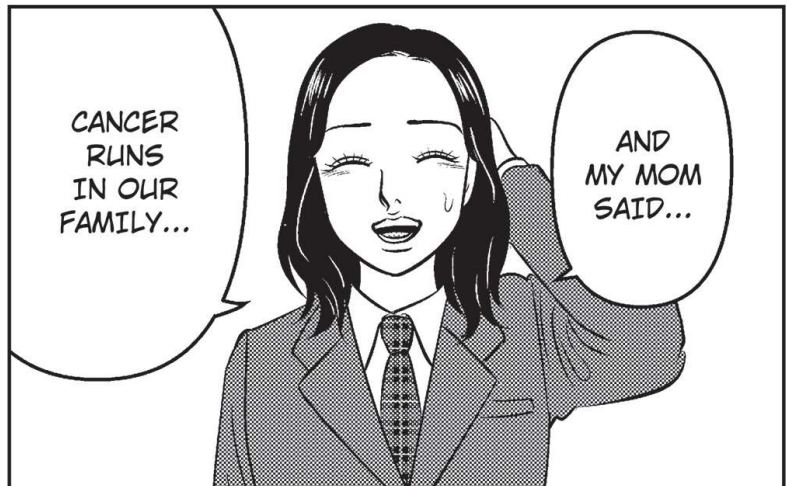
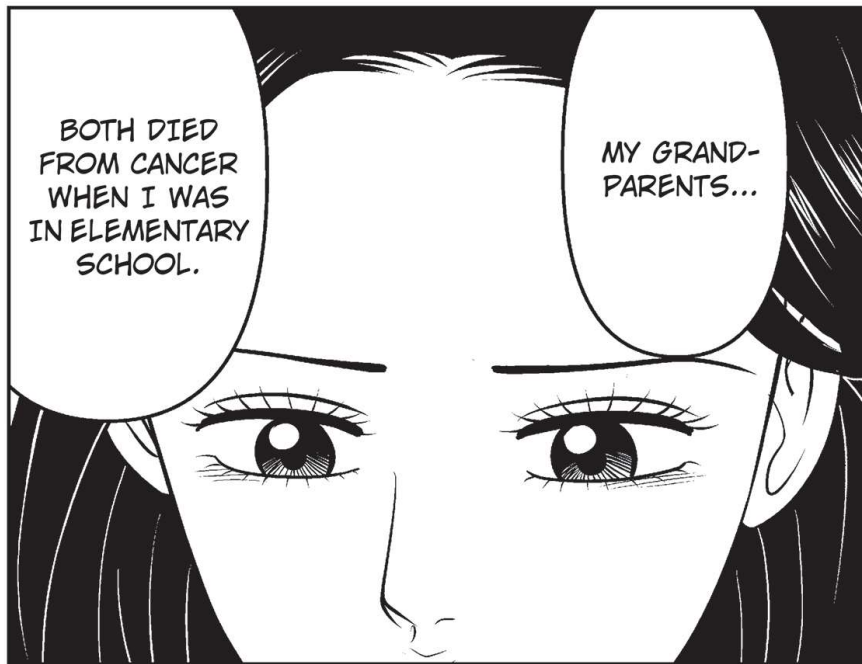
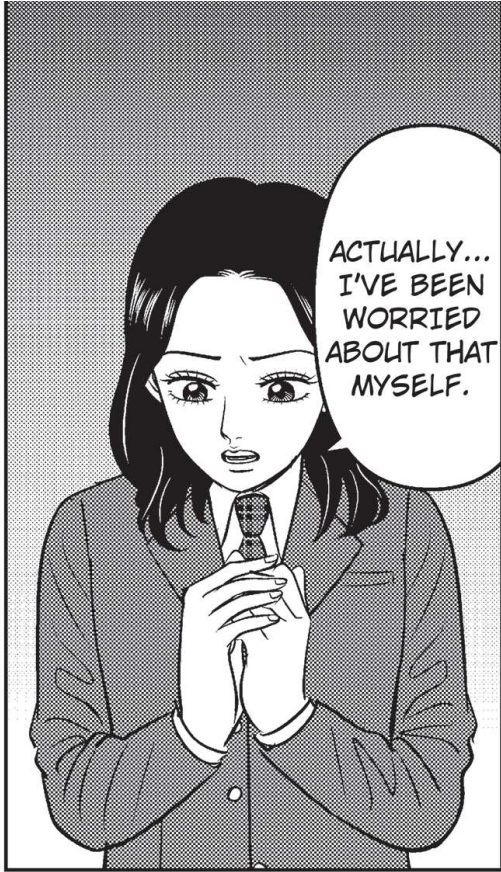
SUFFERING FROM THE SIDE EFFECTS OF ANTICANCER DRUGS.

FOR EXAMPLE... THIS MEANS WE CAN REDUCE THE NUMBER OF PATIENTS...



DRUG... SIDE EFFECTS?

WOW!





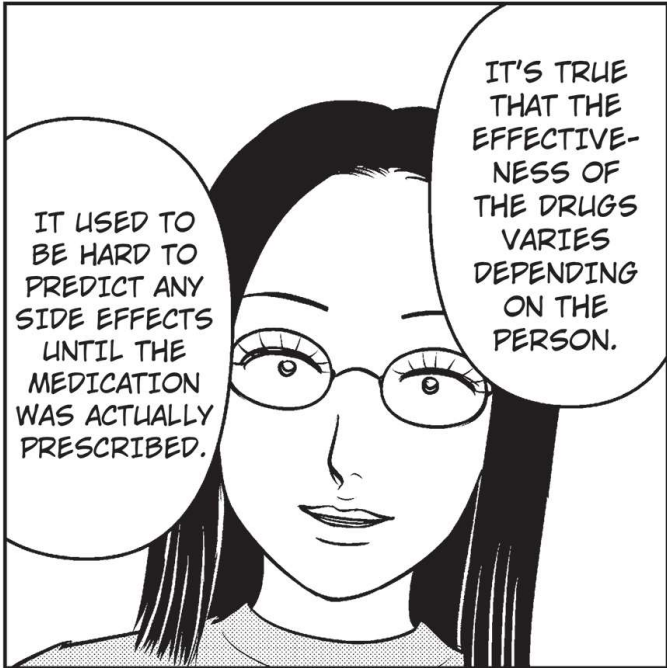
ARE CHANGING.

TIMES...



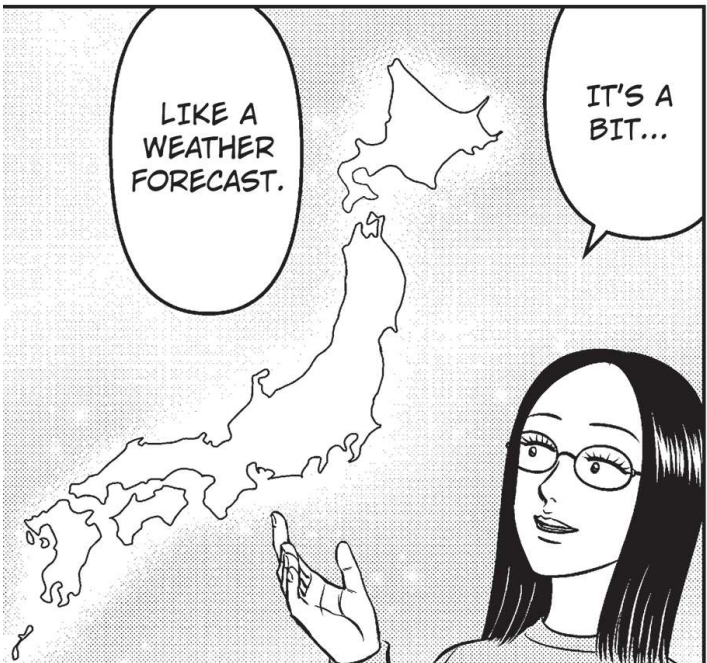
WHEN YOU DON'T KNOW HOW IT WILL AFFECT YOU, RIGHT?

BUT, IT'S ONLY NATURAL TO BE ANXIOUS ABOUT SOMETHING...



IT USED TO BE HARD TO PREDICT ANY SIDE EFFECTS UNTIL THE MEDICATION WAS ACTUALLY PRESCRIBED.

IT'S TRUE THAT THE EFFECTIVENESS OF THE DRUGS VARIES DEPENDING ON THE PERSON.



LIKE A WEATHER FORECAST.

IT'S A BIT...



WE'VE LEARNED TO PREDICT WHAT KIND OF SIDE EFFECTS YOU MIGHT HAVE.

BY LOOKING AT YOUR GENOME...



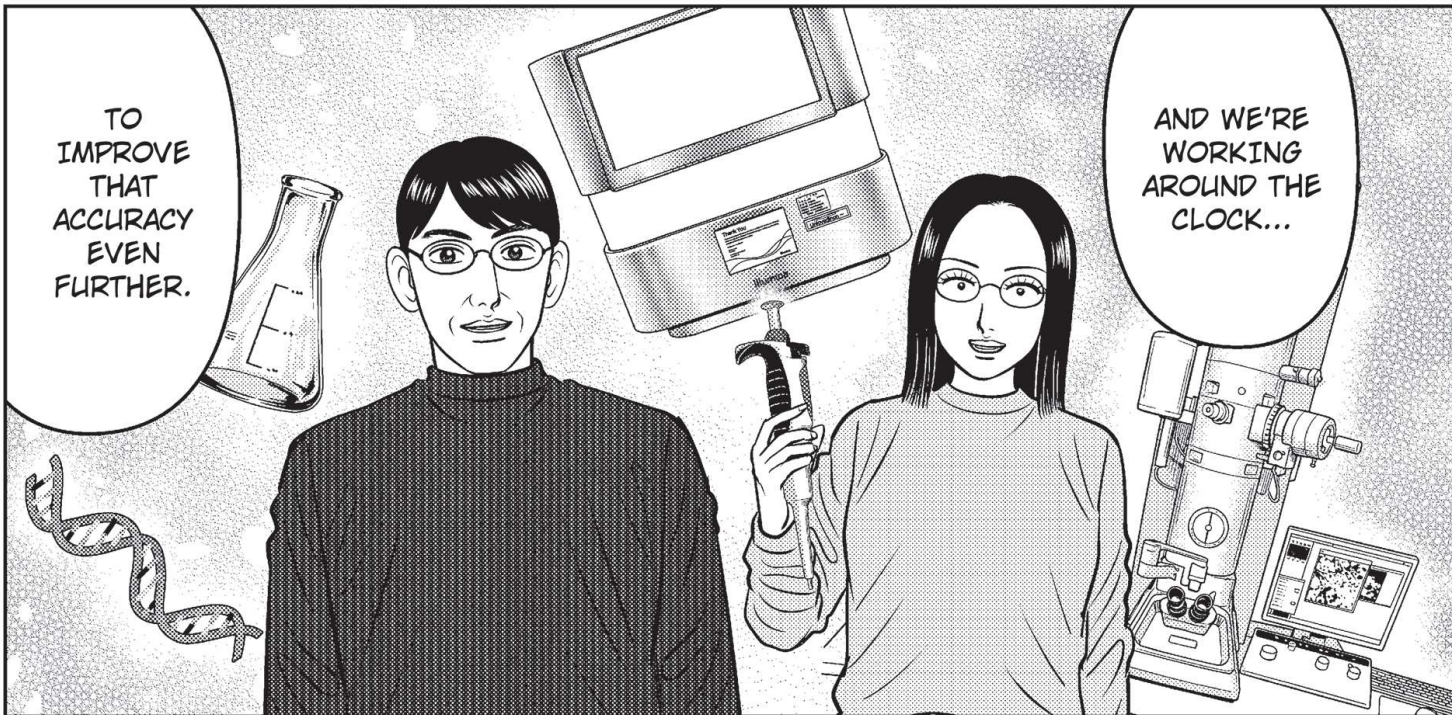
OF HOW HUMAN BODIES REACT, STARTING WITH SIDE EFFECTS.

WE'RE DOING GENOME ANALYSIS RESEARCH TO UNRAVEL THE MYSTERIES...



YOU MIGHT DECIDE TO PUT ON BOOTS.

IF YOU KNOW IT'S GOING TO SNOW...



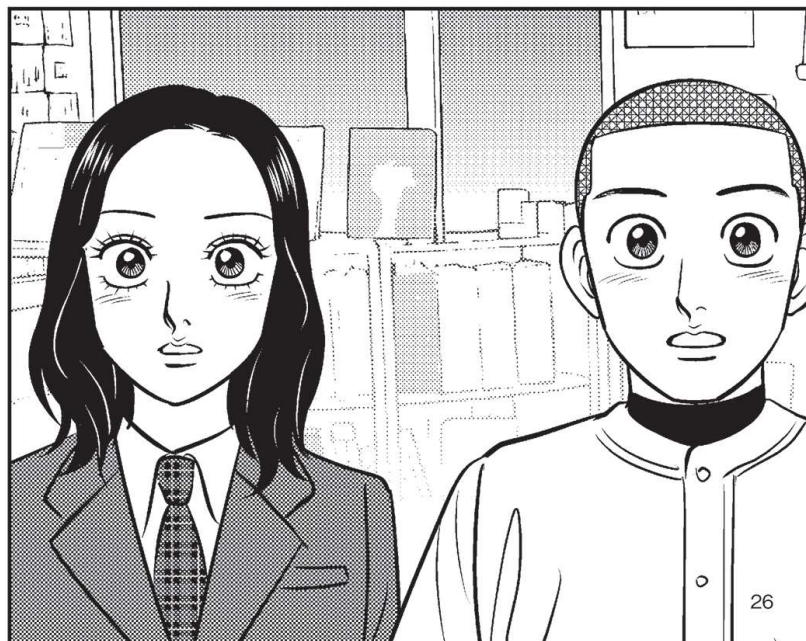
TO IMPROVE THAT ACCURACY EVEN FURTHER.

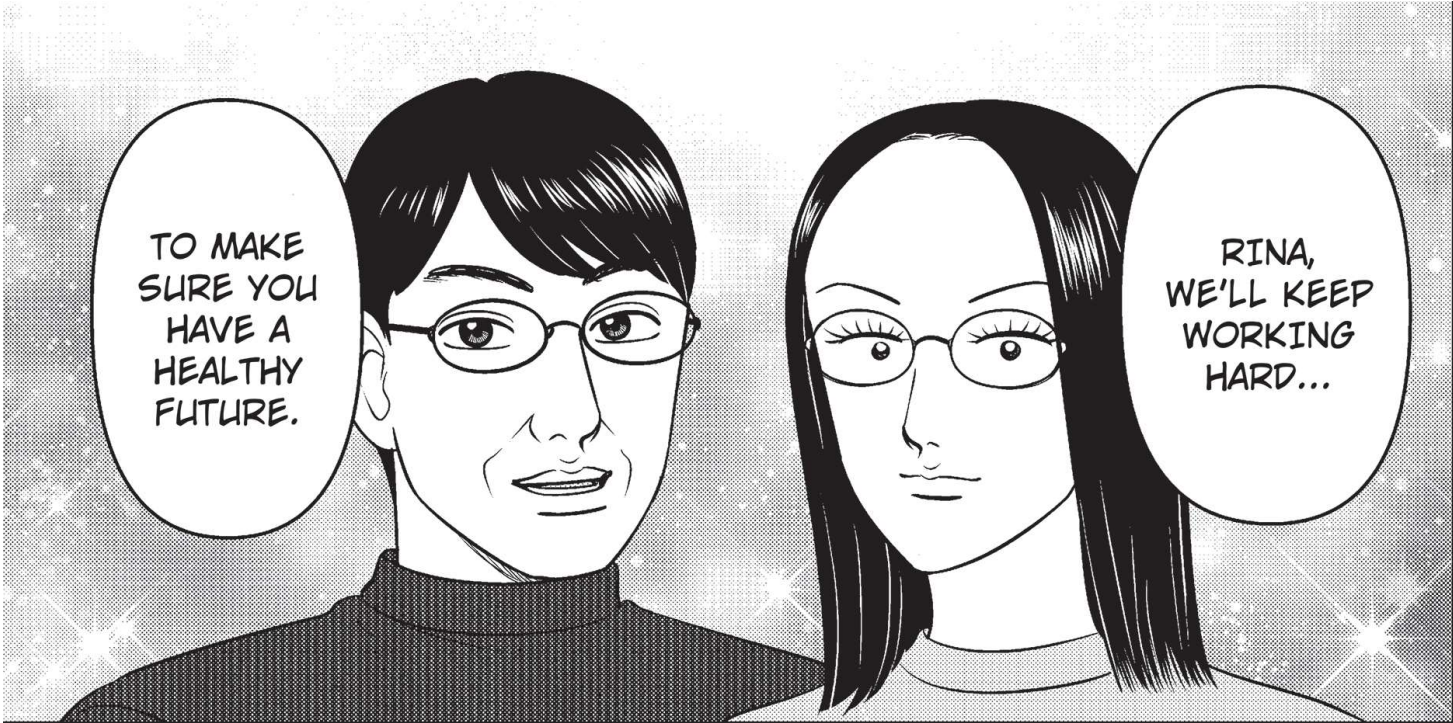
AND WE'RE WORKING AROUND THE CLOCK...



WE'RE STARTING TO HAVE CONCRETE HOPES FOR THE FUTURE.

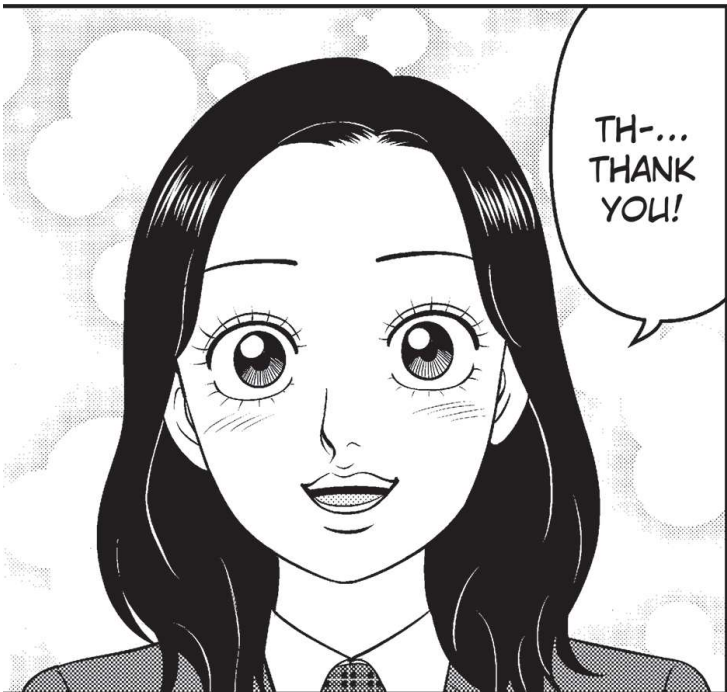
THE OPTIONS AVAILABLE FOR CANCER PATIENTS HAVE EXPANDED RAPIDLY IN RECENT YEARS.



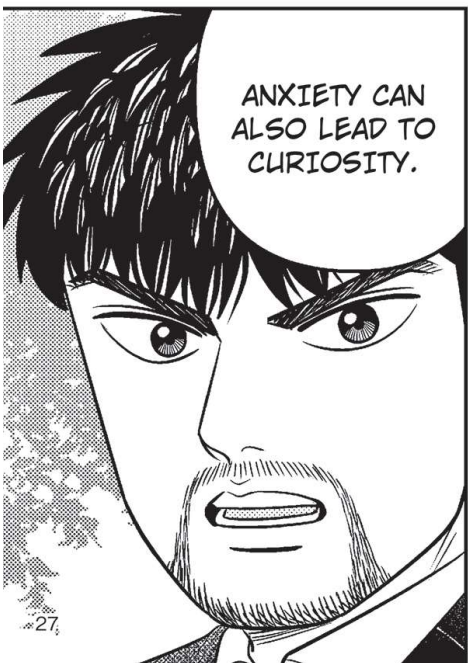
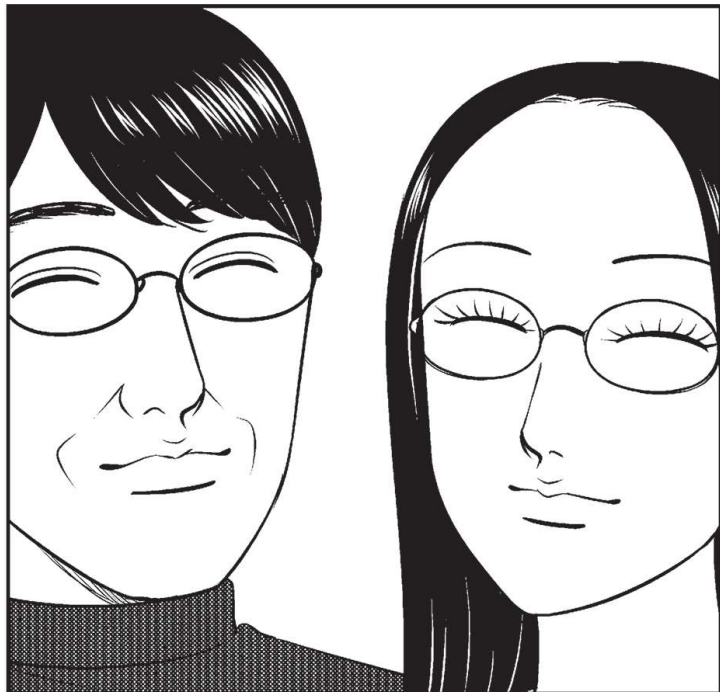


TO MAKE SURE YOU HAVE A HEALTHY FUTURE.

RINA, WE'LL KEEP WORKING HARD...



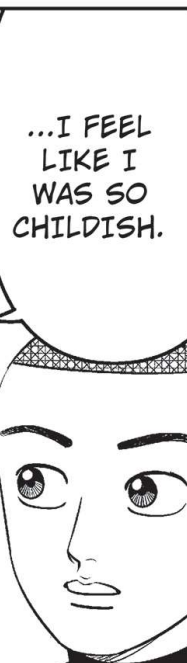
TH-... THANK YOU!



ANXIETY CAN ALSO LEAD TO CURIOSITY.



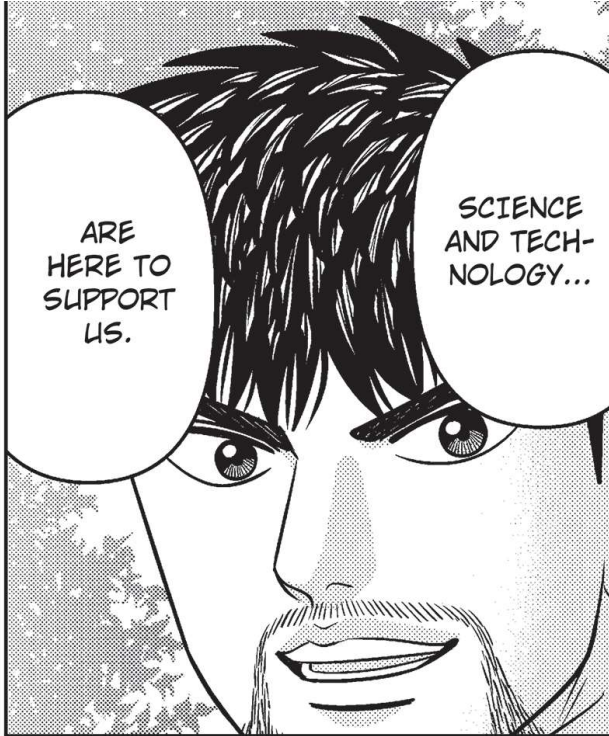
I WAS GETTING ANXIOUS FOR NO REASON.



...I FEEL LIKE I WAS SO CHILDISH.



ON THE WAY BACK



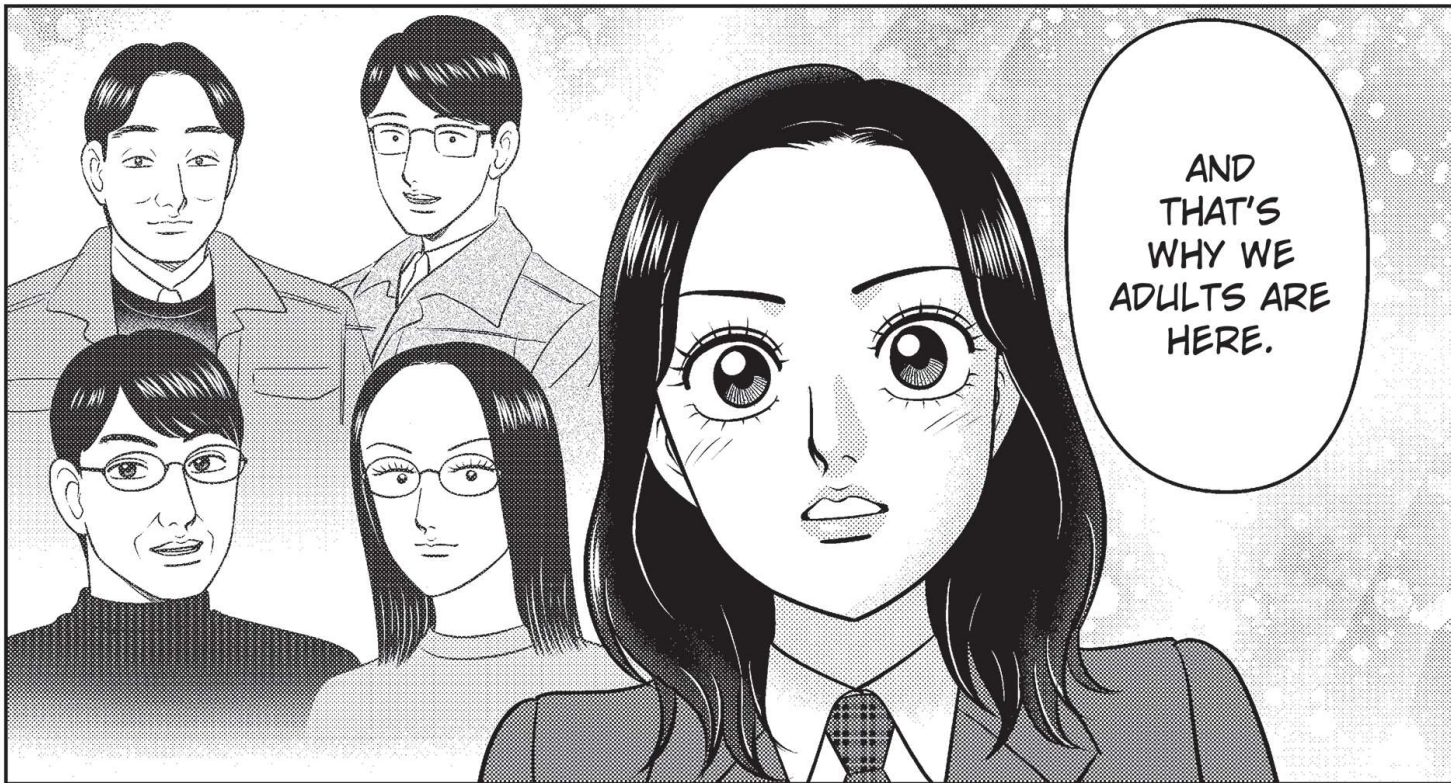
ARE
HERE TO
SUPPORT
US.

SCIENCE
AND TECH-
NOLOGY...

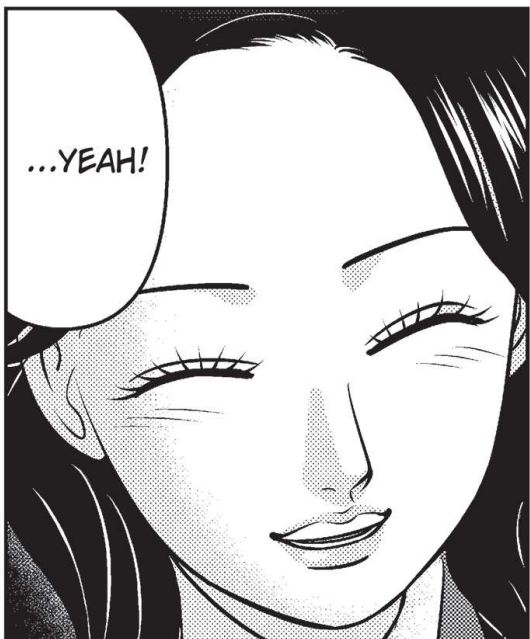


ALL YOU
NEED TO
DO IS
APPROACH
THAT WORRY
WITH THE
RIGHT KNOW-
LEDGE.

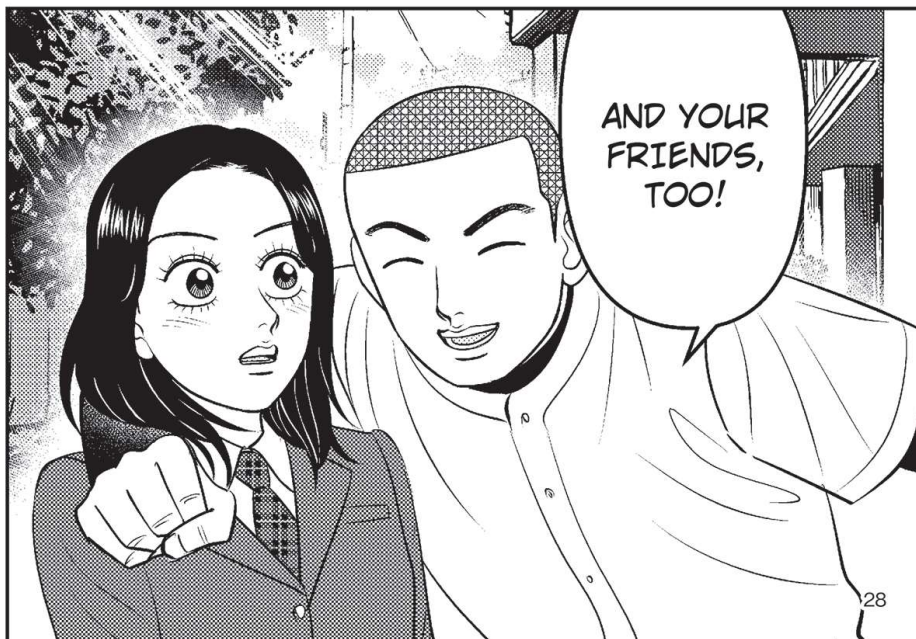
WORRYING
ABOUT
SOMETHING
ISN'T BAD IN
ITSELF.



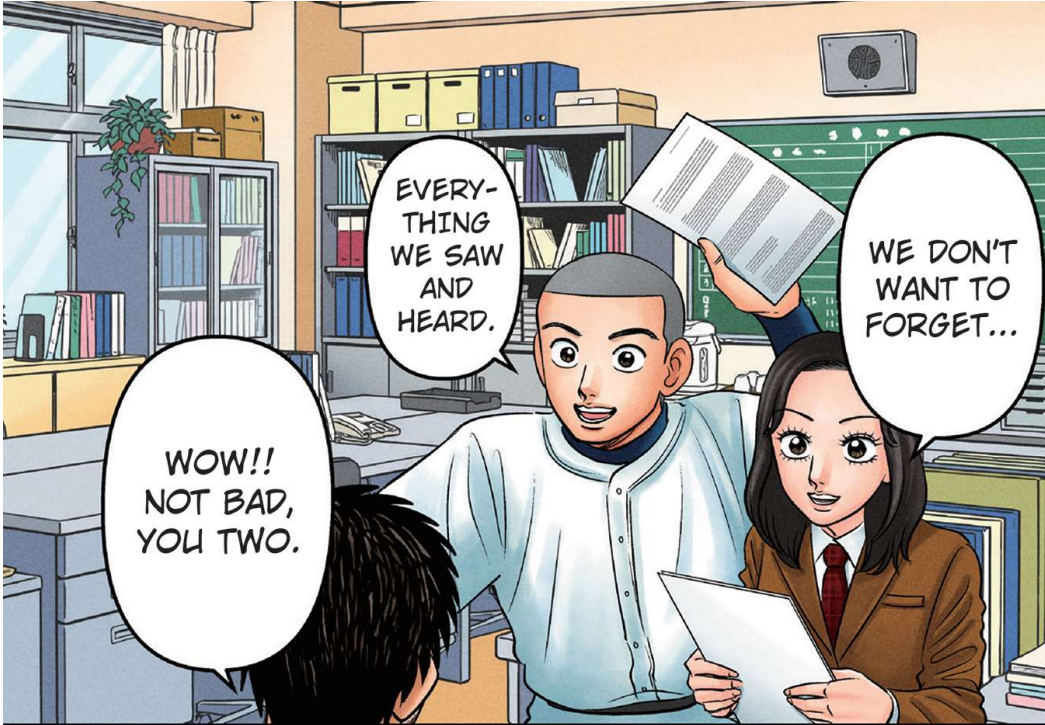
AND
THAT'S
WHY WE
ADULTS ARE
HERE.



...YEAH!



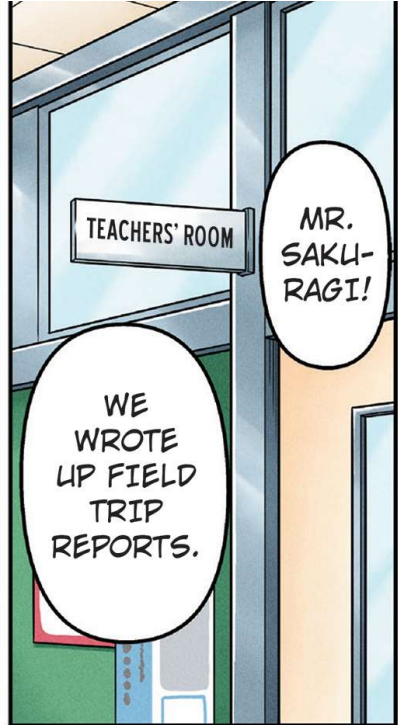
AND YOUR
FRIENDS,
TOO!



WOW!! NOT BAD, YOU TWO.

EVERYTHING WE SAW AND HEARD.

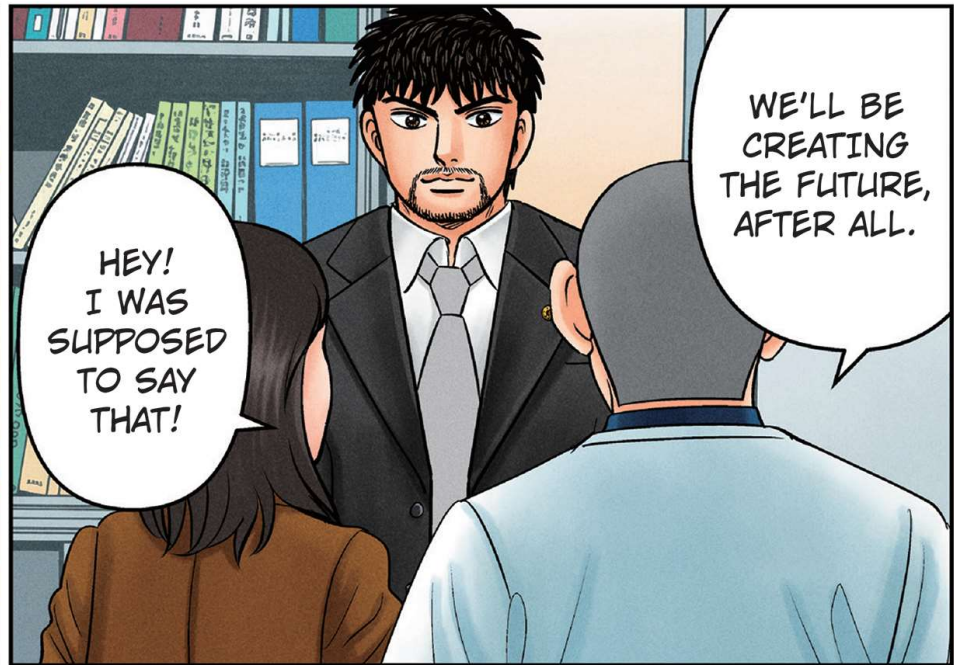
WE DON'T WANT TO FORGET...



TEACHERS' ROOM

MR. SAKURAGI!

WE WROTE UP FIELD TRIP REPORTS.



HEY! I WAS SUPPOSED TO SAY THAT!

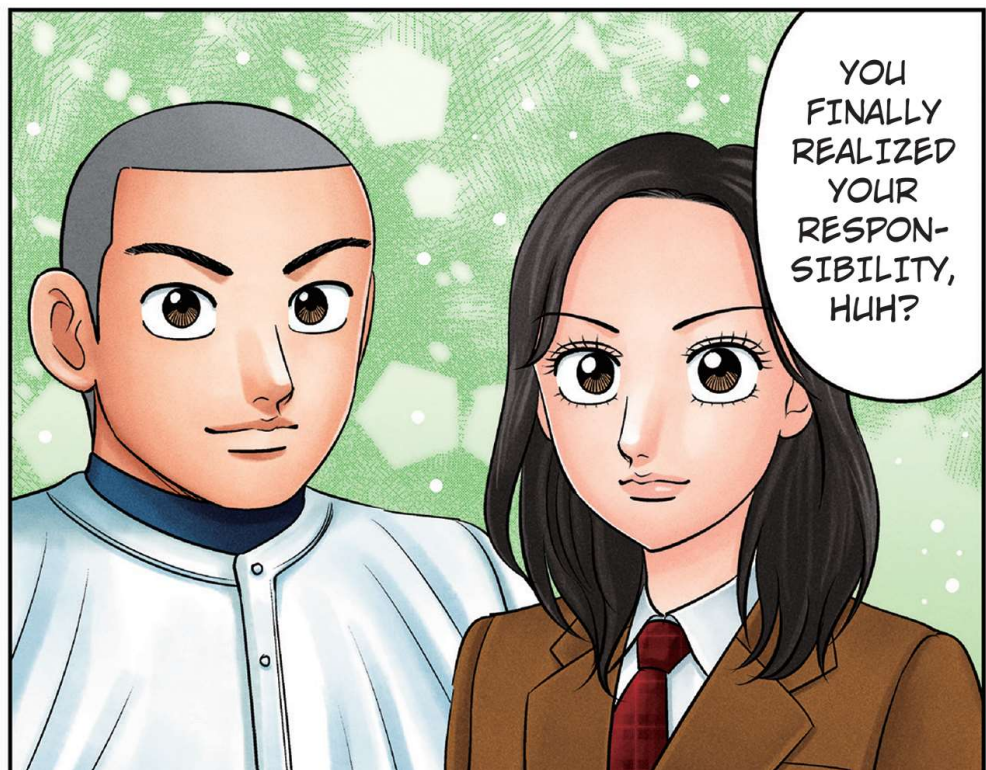
WE'LL BE CREATING THE FUTURE, AFTER ALL.



TODAY'S THE FIRST STEP TO CREATING THE TOKYO OF THE FUTURE!

AL-RIGHT!

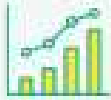
YEAH!!



YOU FINALLY REALIZED YOUR RESPONSIBILITY, HUH?

Tokyo Environmental Public Service Corporation
Tokyo Metropolitan Research Institute
for Environmental Protection

An institute engaged in research to scientifically understand aspects of Tokyo's environment—including its air, water, and the effects of climate change—while promoting coexistence with nature and working toward the realization of zero emissions.



Tokyo Metropolitan Islands Area
Research and Development Center for
Agriculture, Forestry and Fisheries

A research and development center engaged in research on island-specific fruit trees, vegetables, and flowers, as well as marine resources in each surrounding maritime area, to support agriculture and fisheries in the Izu and Ogasawara Islands.

Tokyo Development Foundation for Agriculture,
Forestry and Fisheries

Tokyo Metropolitan Agriculture and
Forestry Research Center

Engaged in research on Tokyo-specific fruit trees, vegetables, and flowers, as well as greening and forest conservation, to support sustainable agriculture and forestry in Tokyo.

Tokyo Metropolitan Institute
of Public Health

A research institute that studies infectious diseases, food, pharmaceuticals, and the environment to protect the lives and health of Tokyo residents.

Tokyo Metropolitan Geriatric Hospital
and Institute of Gerontology

A research institute that focuses on the cause of diseases and develops treatments; it also studies the lifestyles and living environments of older adults to help them maintain and improve their health.

Tokyo Metropolitan Institute
of Medical Science

An institute conducting comprehensive research into major unresolved diseases, including neurological and mental disorders, cancer, and infectious diseases, to improve medical care and welfare provision.



**Tokyo Metropolitan
Research Institutions**

Operated by the Tokyo Metropolitan Government, these institutions conduct research and develop technologies across fields such as healthcare, the environment, and industry to improve daily life and support the city's future.



Tokyo Metropolitan Public Corporation for Road Improvement and Management
Tokyo Metropolitan Civil Engineering Technical Support Center

We engage in research, development, and technical support to assist civil engineering operations and advance infrastructure projects.

Tokyo Metropolitan Public University Corporation
Tokyo Metropolitan University

The only comprehensive university established by the Tokyo Metropolitan Government, it is engaged in a wide range of research in various fields from humanities to sciences, based on the free ideas of researchers.

Safety Promotion Department,
Tokyo Fire Department
Fire Technology Research and Development Center

An organization that addresses firefighting challenges by introducing innovative technologies and tactics through industry–government–academia collaborative research and development.

Tokyo Metropolitan Leather Technology Center

In order to support small and medium-sized enterprises in the leather-related industry—a traditional local industry in Tokyo—the center is engaged in research and technical support related to leather, shoes, and other types of footwear.

Tokyo Metropolitan Industrial Technology Research Institute

A research institute supporting Tokyo's industries by conducting R&D and providing technical support for small and medium-sized enterprises, which make up 99% of the city's businesses.



Tokyo Metropolitan Government
Bureau of Waterworks

Training and Development Center

An organization developing technologies to protect about 28,000 km of water pipelines, equivalent to two-thirds of Earth's circumference, and to deliver safe and pleasant taste drinking water.

Tokyo Metropolitan Government Bureau of Sewerage
Sewerage Technology Research and Development Center

A research body developing technologies through the integration of innovations and insights from diverse fields, with the aim of achieving a safe, comfortable living environment and a healthy water supply cycle.

