



ABSTRACT

Developing reading and writing skills are important for learners because they can communicate their feelings, thoughts, and emotional issues. For these reasons I chose them for working on my proposal which is about Science fiction and the novel "I, Robot" written by Isaac Asimov. Moreover, there is a brief reading about The Whole Language approach and some exercises based in the novel.

The proposal begins with a short biography about the novel's author Isaac Asimov and tells about his life, career, and death. Then there are introduction about science fiction and its issues. Reading and writing skills are developed. The Whole Language approach is mentioned in order that it is an available approach teachers should apply in their classes. It gives some cues on how to management classrooms and all related with it. This approach is according with educational curriculum. The exercises are the last activities which are focused on the novel *I, Robot*.

The teachers should be conscious that the learning-teaching process is constantly changed. I hope this proposal helps some English teachers improve the skills on reading and writing, and changes the traditional methodology by applying the new technological devices.

Key Words: Science Fiction, Reading, Writing, Whole Language, Isaac Asimov, *I, Robot*.



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TEMA:

***“DEVELOPING READING AND WRITING SKILLS THROUGH SCIENCE
FICTION: I, ROBOT BY ISAAC ASIMOV”***

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AUTHORSHIP

All the content of this thesis is the exclusive responsibility of its author.

Marixa Noemi Maldonado Perez



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Firstly, I want to thank God for every moment of my life, because he blesses me and he helped me to conclude this work. I also thank my tutor for her effective guide in this work. I also thank all my teachers, who shared their knowledge all time that I spent in this University. This new knowledge will help me become a good teacher.

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This work is dedicated to my dear family, and everyone who helped me conclude my career: my dear father Manuel Jacinto and my sisters, Patricia, Sonia, Mayda, Jorge, Dayanna, and Julissa, supported me every moment of my life, and never left me alone. Specially my dear angels my mother Amada and my grandmother Rosanna. They take care me from Heaven. I miss you a lot. I want to share my good moments with you.

God blesses you forever.

Marixa Noemi Maldonado Pérez



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INTRODUCTION

My proposal is focused on how to develop reading and writing skills in the science fiction novel *I, Robot*, in the classroom which has some activities and a briefly introduction about the Whole Language approach in the classroom. It is addressed to students of tenth year of the Basic Education the Victor at León Vívar high school.

In chapter one, I mention Isaac Asimov and his life: early years, career, marriages, works, and his death. There is also a briefly view about science fiction and some important aspects about it.

Chapter two refers to reading and writing skills in the classroom and some tips, reasons, kinds, process, advice and issues for developing these two skills in a better way.

Chapter three is a briefly introduction about the Whole Language approach and some issues about it. There are also some samples of activities using the novel *I, Robot* and the Whole Language approach.

I establish that I want to do this proposal, in which I used a novel in order to motivate students to read and write more.

For finishing this project I propose that teachers use literature in order to acquire new knowledge and strengthen the four skills. Moreover, they can apply Whole Language in the classroom because it is a new educational vision. It also contemplates that in the new Ecuadorian Curriculum language should be learning in the students' context using all resources are that around them.



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Oil, Maese. *Ficto and science*. nd.JPEG file.



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CHAPTER I

1. ISAAC ASIMOV BIOGRAPHY

1.1. EARLY YEARS AND CHILDHOOD

“ 1. A robot must not injure a human being, or allow a human being to come harm. 2. A robot must obey the orders given by human beings unless they conflict with the First law. 3. A Robot must protect itself as long as such protection does not conflict with the First or Second Laws” (Asimov 1). These Three Robotic Laws were created by Isaac Asimov in his novel, *I, Robot*. He was one of the three great writers of science fiction novelists in the United States.

Asimov’s works entertained and educated children and people of different ages for fifty years. His real name was Isaak Yudovich Ozimov. He was born on January 2nd 1919, in Petrovichi, Russia, in the Soviet Union. He had a nickname, but only his closed friends knew about it. They often called him “Ike”. His parents were Judah Asimov and Anna Rachel Berman Asimov. They were descendants of Jewish Millers. Judah spent his time in the Russian Army during the First World War. His parents had three children: two sons, Isaac, Stanley, and a daughter, Marcia. Isaac was the oldest one. When he was three years old, his family had to move to Brooklyn, United States, in 1923, where his parents ran a candy store.



1.2. EDUCATION

Asimov's father's candy store also sold science fiction, **Pulps magazines**¹. He began to read at age five. He grew up reading these magazines. He studied at public schools. At school he was smart, and the school's teachers helped him to pass one for two years. Then he was enrolled at a boys high school. Then he assisted at Seth Low Junior College. He graduated from Columbia University. Later, he got his master's degree in Biology and Chemistry in 1939. He spoke English and **Yiddish**².

Asimov's parents taught a religious line, Orthodox Judaism, but he never practiced it because he considered himself to be an atheist. He only believed in science. He considered himself a humanist person. He was very proud of his Jewish roots. Moreover, he was a defender of scientific reasoning, being against religious prophets. However, he was interested in the Bible and wrote some books about it. One of them was *Asimov's guide to the Bible* published in 1967 and 1969. It contained the New and Old Testament.

1.3. HIS CAREER

Asimov's began to write when he was a teenager. He spent all his time reading magazines. He read them secretly because his father thought that he was wasting his time. He convinced his father the magazines were about

¹ **Pulps magazines.** They are so called because they are printed on cheap paper from wood pulp, unglazed, and rough edged.

² **Yiddish.** A language used by Jews in central and eastern Europe before the Holocaust. It was originally a German dialect with words from Hebrew and several modern languages and is today spoken mainly in the US, Israel, and Russia.



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science. He wrote his first work in a high school newspaper. Thus, when he was seventeen years old, he began to write short stories. One of them was titled "*Cosmic Corkscrew*". In fact, he was interested in writing some stories about mystery and fantasy. At the age of nineteen, he bought science fiction magazines. After that, he took a PHD in biochemistry in 1948. He was also interested in history. Then he enlisted in the Philadelphia Navy Yard's Naval Air Experimental station for a few months. In 1951 he taught at the Medical School of Boston University as an assistant. In 1958 he began to write full time because he earned much money for writing science fiction. He sold his science fiction stories to John W. Campbell, Jr.

As the time went by, Campbell met Isaac Asimov, and they became best friends. However, he sometimes rejected Isaac's works, and Isaac was forced to sell his works elsewhere. In 1979, he was a full time professor at Boston University. He was considered the best lecturer of that university. He wrote many science fiction books for every age level. He wrote manuscripts for every branch of science. He wrote 500 books and approximately 90,000 writings and postcards. *The Foundation Series*, and *Three laws of Robotics*, *I, Robot*, were the most important contributions for Science Fiction. The Novel "*I, robot*" was made into a movie in 2004, which had some changes from the original version. He was a president of **MENSA**, a non-profit organization open to people who score at the 98th percentile or higher on a standardized, supervised IQ or other approved intelligence test. On the other hand, Oxford Dictionary also recognized him for such words as "positronic", "psychohistory", and "robotics". His life was involved with fame and success.



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He received many awards for his writings. In 1997, posthumous in, he was recognized in the Hall of Science and Fantasy. Ten years later, after Isaac's death his wife, Janet, edited "*It's Been a Good Life*", a recompilation of the three autobiographies *In Memory Yet Green*, 1979, *In joy Still Felt*, 1980, and *I Asimov*. In 2009, a Crater on the planet Mars was called Asimov in his honor.

1.4. HIS MARRIAGES

Gertrude Blugerman and Isaac Asimov met on a blind date on Valentine's Day. Five months later, they got married on July 26, 1942. From this marriage, they had two children. The first one was David, who was born in 1951, and the second one, Robyn Joan, in 1955. On September 1956, while he was signing some autographs at a science fiction convention, he met a beautiful woman named Janet Opal Jeppson. She was born on August 6, 1926, in Ashland, Pennsylvania. She got a Master's Degree from New York University Medical School. On May 1, 1959, her friend, Veronica Parker Johnson invited them for a mystery writers' banquet. There, they sat together and felt attracted to one another. As a result, his relationship with Gertrude finished in 1970. Three years later, they were formally divorced in 1973. He moved to live with Opal, and they got married on November 30, 1973. They didn't have any children.



1.5. HIS DEATH, ILLNESS, AND FEARS

Asimov had developed two great fears, claustrophobia and a fear of flying. His fears were reflected in his writings. He used to work in a better way if he was in a closed place. The rooms where he worked were windowless, and he always used artificial lights. In 1978, on the Labor Day, the 36th World Science Fiction Convention was held in Phoenix, Arizona. "I didn't attend because I do not fly." (Asimov 247). It was amazing how a man, who could describe travels to other galaxies and new worlds, could not take an airplane. Instead, he truly enjoyed travelling by ship. Sometimes, he used to take a trip on the Queen Elizabeth 2, where he told the passengers about his stories and science fiction novels. When he graduated from the university, his physical condition was bad, but his intelligence exceeded all frontiers; and that's why he stayed in the Army. On the other hand, his political tendency was the Democratic Party. This party reflected his ideas about freedom. He was also against the Vietnam War in 1960 because he felt the cruel disaster in the Second World War. At that time he was in the Naval Air where his friends created the Atomic Bomb, but he never participated in its elaboration.

In 1983 he was ill, and doctors performed a triple bypass surgery because he had suffered many heart attacks beforehand. During this surgery doctors gave him a blood transfusion in which he was infected with Aids. He wanted to tell about it, but the doctors asked him not to say anything. Finally, he died on April 6, 1992, in Boston, Massachusetts. His death was due to heart and a renal failure. Ten years later, his wife Janet Jeppson said that Asimov's death



was caused by Aids. He wished his ashes not to be buried but scattered, and so they were.

1.6 SCIENCE FICTION

Definitions

- The word "**Fiction** " comes from the Latin word "**fictionem**" meaning " **to invent.**" The word "**science** " comes from the Latin word "**scientia**" meaning "**Knowledge**".
- "Science fiction is a branch of literature that deals with human responses to changes in the level of science and technology" (Asimov 22).
- "Science fiction is considered a literary or cinematic genre in which fantasy, is typically based on speculative scientific discoveries or developments, environmental changes, space travel, or life on other planets, forms part of the plot or background." (*American Heritage Dictionary*1560).

1.7 ORIGIN

Science fiction took as its major points science and technology changes, among them the Atomic Bombs, and moon trips. In fact, science fiction does not predict a particular change. It predicts a new change, and it often becomes true.



1.8 SCIENCE FICTION AND SOCIETY

Society changes as years go by. The transitions of the dark ages to the culture of Middle Ages, the Protestant Reformation, Industrial Revolution, some inventions like the print, agricultural development, the wheel, and the advance in science and technology were clues for people who wanted to express their thoughts by writing. At the beginning of the nineteenth century, science fiction came as a literary response to a new curiosity that had not existed in history. The first novel was *Frankenstein* by Mary Shelley, which was published in Great Britain, the home of the Industrial Revolution, in 1818, was a true science fiction. The mixed effects of magic, the supernatural, and the applications of the scientific techniques had as a result science fiction novels.

After the First World War, Karel Capek wrote *R.U. R.* ("Rossem's Universal Robots") concerning the mass production of artificial living creatures called "Robots," the Czech word for "slaves." (Asimov 107).

In 1926 Hugo Gernsback published the first science fiction magazine. It was exclusively related to science fiction. It was called *Amazing Stories*. Suddenly, new magazines emerged, such as *Astounding Stories*, *Marvel Stories*, and *Startling Stories*. Firstly, Gernsback had thought to call it *Scientific Fiction*, but he decided to change it because scientific fiction was a hard word. He used for it the abbreviation "STF". In 1929, he changed the name of that magazine *Amazing Stories* to "*Science Fiction*," and its abbreviation "S.F." Sometimes that word was hyphenated Science- Fiction. In



1950, Isaac Asimov began to write some science fiction magazines based on science and technology.

1.9 HOW SCIENCE FICTION CAME TO BE A BIG BUSINESS

Science fiction soon became a big business. In the middle nineteenth century, there were only three science fiction magazines in the United States of America. *Astounding Stories* magazines where John Campbell Jr. was the administrator paid a penny a word. It meant that a writer could win \$50 for a short story and \$ 600 for a novel. John Campbell began to look for some writers who were scientists and engineers. He joined a group of writers like Robert A. Heinlein, Arthur C. Clarke, Lester Del Rey, Theodore Sturgeon, A.E.van Vogt, Hal Clement, and Isaac Asimov, but only Heinlein, Asimov and Clarke were the Campbell writers, so they were called " The Big Three".

When the atomic bomb was discovered and it exploded in Hiroshima, people began to read more and more science fiction magazines. In 1950, there were many science fiction magazines, and many new titles appeared. The inventions of some electronic devices from pocket sized radios, desk top computers, the intelligent machines of science fiction, the television, and the jet planet allowed science fiction to come true.

Science fiction magazines made people see the dramatic future more. Most producers chose these elements for the films as money makers. The scenes of Earth's destruction, monsters destroying the cities, comets destroying the earth, and more effects were the clues for success.



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1.10 THE ISSUES OF SCIENCE FICTION BY ISAAC ASIMOV

The writing issues of Isaac Asimov were based on science and technology, especially in robots, computers, aliens, planets, earth, and monsters. Many of them were reflected in his novels. In 1940, he wrote "The Foundation Series." Its content was about galaxies, quasars, pulsars, or black holes. In 1950, he wrote "I, Robot" which was about many robots in a solar space station and the robotic laws.



CHAPTER II

2.1.TEACHING WRITING AND READING IN THE CLASSROOM



Allison, Maura. *Reading Salad Lesson*. Oct, 11, 2011. JPEG file.

Writing is one of the skills that students have to develop and improve in a foreign language classroom. By learning how to write, they can communicate. Writing allows students to express their feelings, thoughts, and ideas. Actually, it is a process in which the students can practice a variety of exercises and widen their knowledge.

According to Brookes and Grundy, "Social constructivism views chiefly influence the teaching of English for special purposes, they also remind that writing takes place in a community and isn't just an individual act." (9) Thus, writing allows students to communicate and give a point of view about any topic.

In fact, learning how to write is a process that students should be trained since they are in kindergarten. First, they learn how to write down their name, and gradually, they learn to write words, phrases, paragraphs, and



compositions. Later on, learners write in an academic style: poetry, essays, and literature.

2.2. REASONS FOR WRITING

People write for different reasons:

- To express meaning
- To have the opportunity to combine learned elements.
- To present results in a productive way; this is a measure of proficiency, and it is viewed as an accomplishment for both the learner and the teacher.
- To share any social event in the school, with classmates or friends, at home or in other settings.
- To reflect the creativity and individuality of an author.
- To involve complex operations those that are different from the ones required for speech.

2.3. THE WRITING PROCESS

The writing process is made up of five main stages: prewriting, drafting, revising, proofreading, and publishing or sharing the final product.

2.3.1. PREWRITING

In this stage, learners could perform the following actions:

- To choose a topic.
- To think about the audience.
- To brainstorm their ideas about the topic.
- To do a list of resources in which they can look for information about the topic.
- To search about the topic.



2.3.2. DRAFTING

In this second stage, learners can perform the following actions:

- To write statements and paragraphs; it doesn't matter if this first drafting has mistakes.
- To decide if the content is the result of what they want to express.
- To ask someone to read their work in order to check it and give some suggestions about how to improve it.

2.3.3. REVISING:

This stage involves the following actions:

- To read once and again the topic.
- To reflect about the changes that their classmates or teacher have suggested them to make.
- To write down the suggestions and change some words or statements.
- To bring out or add more phrases, words, or sentences.
- To replace the ambiguous words or those which are not clear.
- To read their work in an oral way. By doing this, they can realize whether it is spontaneous or not.

2.3.4. PROOFREADING

This stage involves the following actions:

- To review whether new statements have been aggregated.
- To check and correct spelling, capitalization, and punctuation.
- To switch words and phrases, mainly the ones that are not used in an appropriate way.

2.3.5. PUBLISHING



This final stage involves:

- To read the final work to the classmates.
- To share it with family or friends.
- To exhibit the work on the high school bulletin board.
- To do a presentation of the work.

2.4. KINDS OF WRITING

Writing a composition or any kind of writing provides learners the opportunity to express their feelings, opinions, points of view, or thoughts. The teacher can motivate learners to write by praising them or assigning them good grades.

There are many kinds of writing, but the most useful are the following ones:

Personal Writing: It includes daily activities, shopping lists, reminders, and recipes.

Social writing: It involves thank you letters, invitations, congratulations, text messages, or instructions.

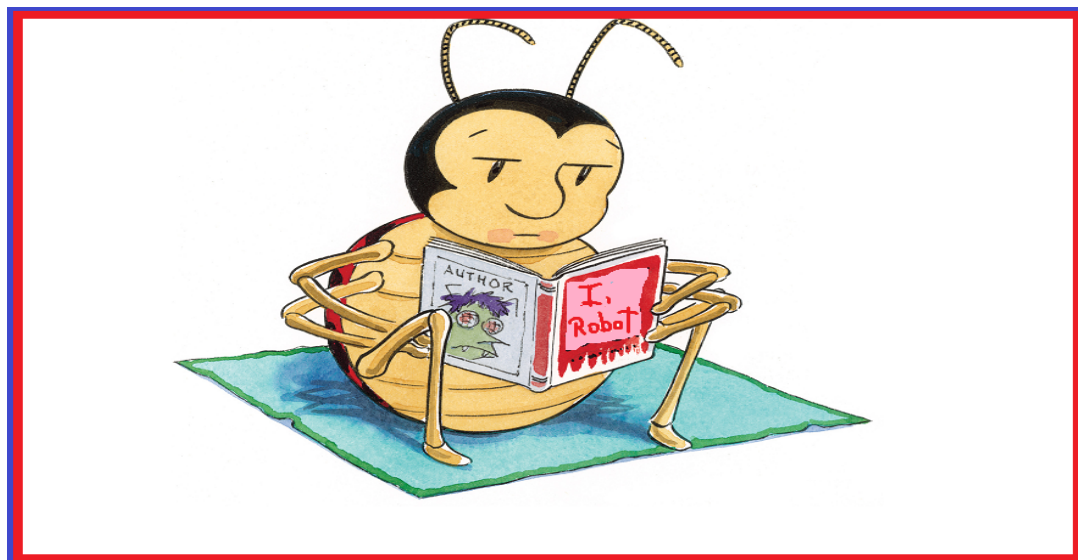
Public writing: It contains letters, forms, posters, menus, or magazines.

Creative Writing: It includes poetry, riddles, stories, plays, songs.

Studying writing: It includes personal dictionaries and self-assessment. (Ellis and Brewster 126)



2.5. THE READING SKILL IN THE CLASSROOM



Santa Clara county Library. *Ladybug*. Sept 15, 2011. JPEG File.

Reading is one of the most important of four skills that involve a physical and mental process. It is considered a main human activity. Reading helps students to activate their imagination, to be critic and creative and to be able to develop in an active way. Also, this skill sometimes helps in giving a solution to daily life problems and provides learners pleasure by doing this. Likewise, it requires an intricate interface between the reader and the text.

The reading activity is considered really important since writing appeared some years before. Everybody knows that reading is a process in which our vision and our brain are involved, so our brain processes everything that our eyes see on a text. Consequently, "Reading employs visual input. The eye is the input organ" (Carrel, Devine, and Eskey15). We know that reading is the best way people use to get knowledge. "Pupils are often introduced to and learn new vocabulary or sometimes grammar using reading texts in the form of dialogues, descriptions, instructions, or short stories often lavishly illustrated to support the pupil's understanding". (Ellis, and Brewster 113).



Moreover, reading is a receptive language process. It is a psycholinguistic process that starts with a linguistics surface presentation, encoded by a writer, and ends with meaning that the reader constructs.

Every day, Ecuadorian people read less because they don't have reading habits. Ecuadorian education doesn't involve the teaching of reading. Reading has become a minor activity because teachers and students consider it only as a tool to acquire information. Unfortunately, they do not consider that it is a good activity that should be strengthened. It gives students the opportunity to be critical, reflective, and creative.

2.6. REASONS FOR READING

The reading skill should be encouraged for many reasons:

- To improve the communication process and increase vocabulary.
- To enhance a communicative capacity and develop interpersonal relationships.
- To encourage people's thinking by being critical, reflective, and analytic about a certain issue.
- To increase knowledge in a meaningful way.
- To expand people's horizons since reading allows people to know about other places, people, traditions, and cultures.

2.7. READING PROCESS

"The brain is the organ to work the information process. The brain seeks to maximize information; it acquires and minimizes the effort and energy used to acquire it." (Carrel, Devine, and Eskey 16). As a result, there is a process the brain follows to improve reading.

- ✓ **Recognition-initiation:** Our brain must recognize a graphic display in the visual field as written language and initiate language.
- ✓ **Prediction:** The brain is always anticipating and predicting as it seeks order and significance in sensory input.
- ✓ **Confirmation:** If the brain predicts, it must also seek to verify its predictions.



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- ✓ **Correction:** When the brain finds inconsistencies or its predictions are disconfirmed, the brain reprocesses.
- ✓ **Termination:** The brain finishes reading when the reading task is completed.

2.8. DIFFERENT KINDS OF READING

It is really important to know why students read; or in other words, what are the purposes students have for reading. It can be stated that students read for a variety of purposes; among them:

- ✓ **Skimming:** The readers focus their attention only on the main ideas. They don't read every single word. Sometimes they read just the table contents quickly. They want just to get the general idea.
- ✓ **Scanning:** The reader looks for specific ideas or certain details about the reading. It is similar to skimming, but by scanning, the reader wants to get specific information.
- ✓ **Extensive Reading:** This kind of reading stands for students who enjoy practicing this skill. Extensive reading depends on many factors. First, the teacher has to choose a good text according to students' level, likes, and interests. Second, the teacher has to set up a goal for reading that could be accomplished by the students in the classroom. When practicing this kind of reading, the readers don't have to use the dictionary; neither do they have to try to understand every word.
- ✓ **Intensive Reading:** In this kind of reading, the learners read carefully in order to make their homework or any class activities.



2.9. SOME ADVICE FOR IMPROVING READING

The following are six tips for improving reading:

✓ **Feeling right about reading**

Readers have to choose the reading resources (magazines, books, newspapers) according to their likes, interests, and needs. It is better when learners enjoy reading. The environment is also very important. When readers read in a pleasant and comfortable place, they feel confident and comfortable. Reading also helps learners to gain experience and to learn new vocabulary and structures.

✓ **Purpose for reading before you start.**

Readers must have a purpose for reading, and it must be clear. Having a purpose makes reading more active and enjoyable. Moreover, if the reader has a purpose, he or she has to focus on the main points of reading in order to accomplish his or her purpose. Sometimes, they have to take notes or main points about it.

✓ **Selecting readers**

The reader must be careful when choosing a book because reading always has a purpose. Readers do not have to get worried about easy or difficult books. It is advisable to read the easy books first; and when they have finished reading them, they could try with the difficult ones. By doing this, reading becomes easier.



✓ **Catch the main ideas**

A useful advice for getting a view about a book is the reader should read the conclusion and summaries in order to catch the main ideas. It always saves time having a general idea about the text. Besides, the readers should choose right time for reading in the night or day without distractions in order to concentrate and get good ideas. They should have a purpose for reading because it becomes more interesting.

✓ **Reading slowly and comprehending the text.**

The reader should read very slowly in order to understand the text. That means that the reader has to practice this skill a lot to master it. Sometimes, readers stop when they find a new word to look it up in the dictionary. It is not advisable to do it because by doing this, concentration is lost. It is possible to deduce meaning from context. Maybe the reader can look up the meaning of words she or he does not know later on.

✓ **How to read in an active way.**

To read in an active way, the reader must take notes about their own understanding. Also, the reader has to select the relevant and important ideas in a paragraph or text and summarize them; that means the reader has to express the author's ideas with his or her own words.



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CHAPTER III

3.1 INTRODUCTION WHOLE LANGUAGE APPROACH



Great schools. *10 key questions for preschools*. n.d. JPEG file.

The Whole Language reading instruction is an approach that appeared in the 1969. It is also known as "look-say" or "sight" reading. It was developed by Kenneth S. Goodman. He was president of the International Reading Association. It is the widest approach of teaching reading in schools and high schools in the United States and other countries. It is a constructivist approach to focus on educational context. Constructivist teachers help students produce their own knowledge after a process of reading. Constructivist trainers see the learning process as a cognitive experience exclusive for each learner which is the way to support for new knowledge. "Whole language, then, is a system that combines reading, writing, and oral communication into one area of emphasis." (Akins 2).



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This Whole Reading approach focuses its attention on helping learners make meaning from every reading, make learners express ideas, make creations, interpretations of the text, and give free expressions about it in a written way. The learners can have a diary in which they write about their work every day. It also puts a great emphasis on elevated excellence and diverse literature, taking as its core cultural diversity and integration of the literacy instructions. The teachers must be very creative. They have to bring interesting topics for discussing into the classroom. The teachers should give learners some autonomy so that they can express themselves. It will make possible a better relationship in the classroom and created a positive attitude about education. And the Whole Language approach reading instructions also provides learners the opportunity to read in individual an way, groups, guided groups, and reading aloud with their teacher.

I also think that it is ludicrous to believe that all students are the same, and one method will answer all problems in reading. Whole language, if used correctly and enthusiastically, will achieve its goal of inspiring students to want to read more, but, if used in isolation with the mind-set than “All I have to do is read to them,” it cannot accomplish any goal at all.(Akins 4)

Teachers who use Whole Language believe that reading and writing are closely related because the learner first reads and then he writes about it. For this reason, they can give confidence to learners to read and write for real purposes and given their point of view about the topic. This approach gets



the attention of the learners with a special love for literature and selected topics about love to develop an inner love in them.

The Grammar and spelling mistakes are not taking into account that learners internalize the meaning of the language. The learners' mistakes are used for determining evaluation which creates experiences that help learners correct the shape and structure. Reading approach is not recommended for learners who have reading problems or other kinds of learning process disorder.

"Whole language approach is firmly set in scientific humanistic four pillars: a solid theory about learning, a theory about the language, a vision of teaching and the role it should play the teacher and a concept of curriculum that focuses on the language." (Goodman 9)

The whole Language approach holds that language cannot be taught using letters or combinations of letters. They think it should be taught as a complete process for making meaning, with the words performing in relation with the context. The components of the Whole Language approach are phonemic awareness, phonics, reading, fluency, vocabulary development and reading comprehension.

There are some things The Whole language approach makes easy for learning the language. (Goodman 4).

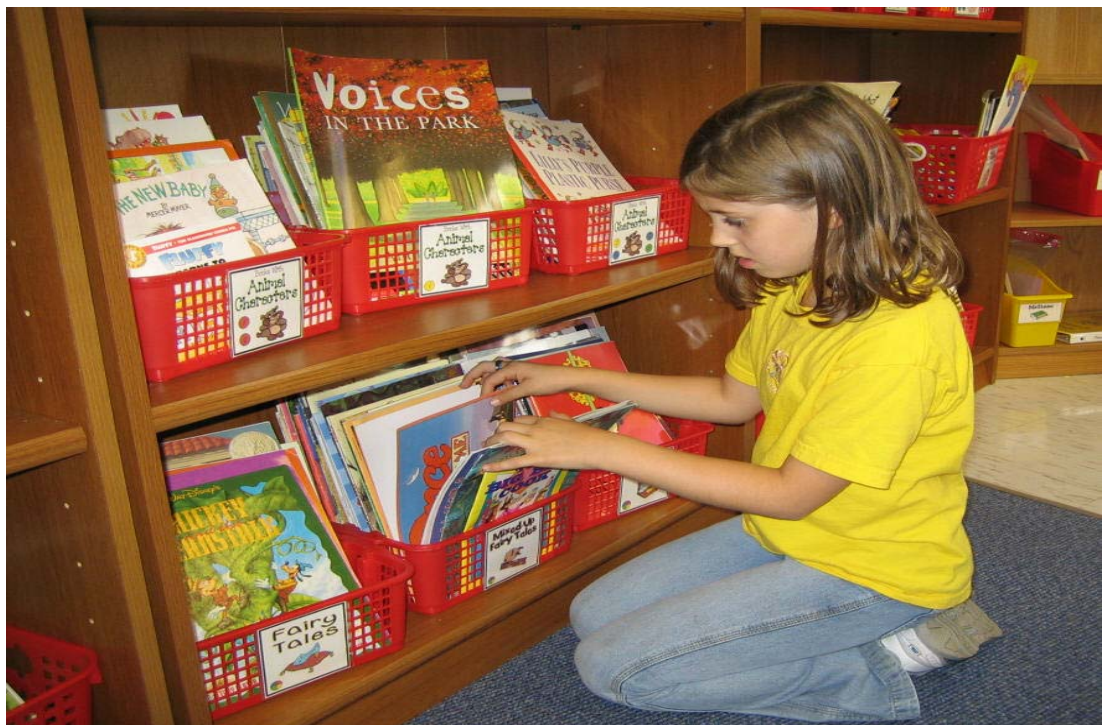
- It is real and natural.
- It is integrated.
- It is interesting.
- It belongs to the student.
- It is relevant.
- It takes place of real fact.
- It has social utility.



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- It has a purpose for student.
- The student can use it.
- The student can have access.
- The student has the way to use it.

The topics of Whole Language are real and related with the students' context, such as the community party, the water in the town, the contamination in its high school, how to make a chocolate cake and so on... The books should be creative and both fiction and non-fictional which have a lot of difficulties and respond to different interests. In many cases topics are incorporated with other subjects, such as literature, science, social studies, arts, humanities, and physical education. The teachers share with their students the design and look for them to be relevant and meaningful activities.



Independentreading-balancedliteracy. *Setting Up Your Balanced Literacy Classroom*. Jun 15, 2011. JGEP file.



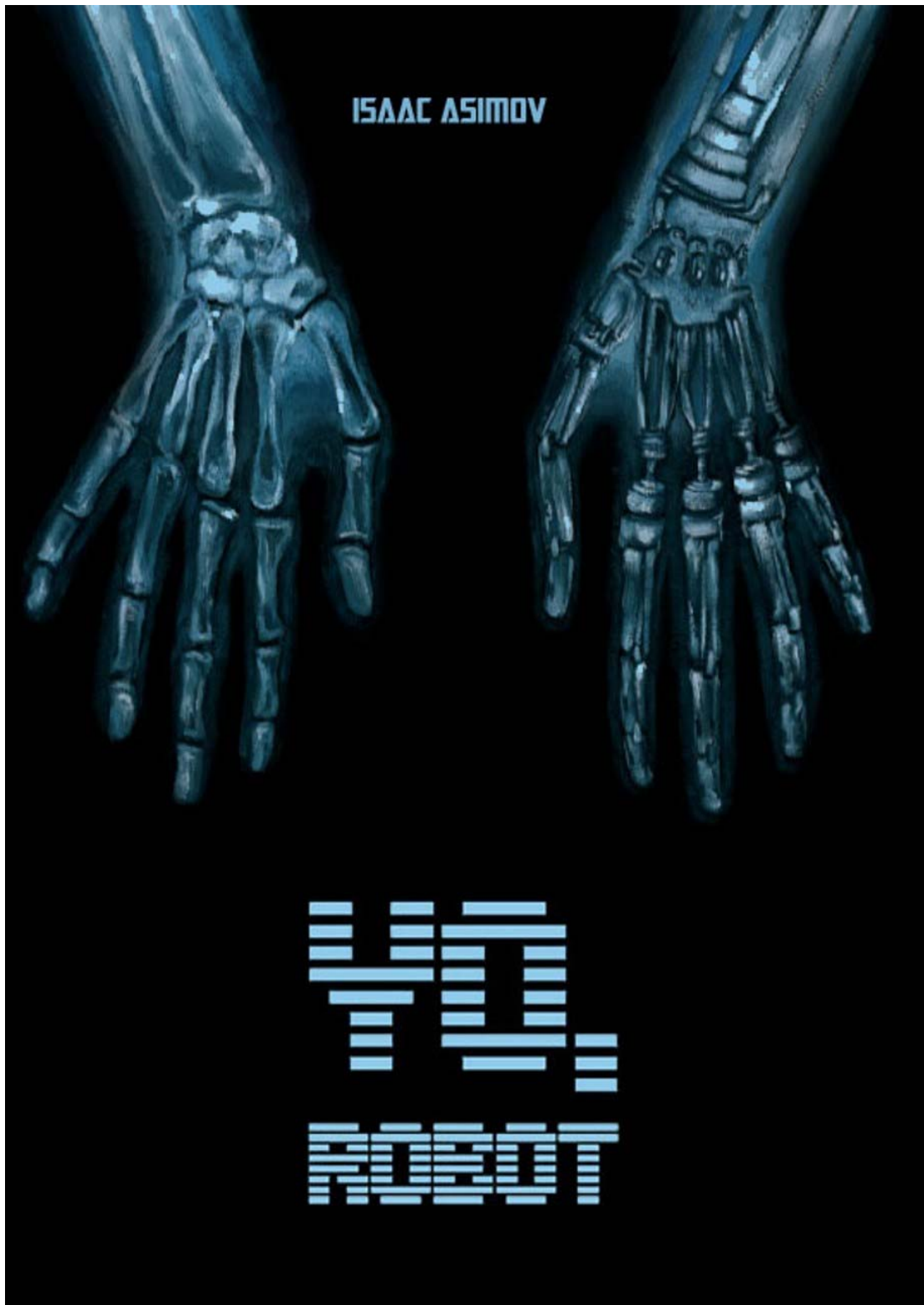
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In a Whole Language classroom there are magazines, books, posters, labels, newspapers, and cardboards and a lot of print resources on the Whole Language wall according to the curriculum and the students' interests. The important thing is that the classroom has a small library. The classroom materials will be organized and supervised by the students and the correct use of them too, which are organized according the educational areas. Whole Language considers it important that student should choose the books. The role of the teacher in the Whole Language is as a guide who participates, monitors, and solves students' fears and disagreements.

The teachers should be known more to use a new approach according to the curriculum and the new educational demands in the XXI century. The contents should be chosen for the teacher with the students in order that the process of teaching-learning will be a natural process using the elements that are related to the students. According to the Whole Language approach this should be functional and meaningful; these students can communicate and use language in their real life.



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Piers, Tony. *I, Robot*. Jun 23, 2011. JPG file.



3.2 SAMPLE READING AND WRITING ACTIVITIES I, ROBOT

TITLE: DR. Calvin

TIME: 30-40 Minutes

PURPOSE: To answer some questions based on the reading.

BASIC ASPECT: Reading, listening and writing.

MATERIALS: An individual hand out.

KEY VOCABULARY: robot, clumsy, Mercury, mines, plain, Psychologist, expedition, colourless.

PROCEDURE:

1. Give each student a copy of the reading.
2. Give students a hand out to do exercises based on the reading.
3. Ask students to answer the questions.
4. Compare the answers.



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Dr. Calvin

1. Answer the following question based on the reading.

What does Dr Calvin look like?



.....
.....
.....
.....
.....
.....
.....

DivertiMaguic. Robot. Abr, 2010. JPEG file.

2. Listen to Voki and complete Dr. Calvin´s Description.

.....
.....
.....
.....

Dr. Calvin´s description

Audioscript: There is a short record working with *Voki*.

TITLE: Runaround

TIME: 40-45 Minutes

AUTORA: Marixa Maldonado Pérez



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PURPOSE: To decide if the statements are true or false based on the reading.

BASIC ASPECT: Reading comprehension.

MATERIALS: One handout per two students.

KEY VOCABULARY: wild, rush, sort, sun side, photocell banks, bitterly, insosuits, positronic brains, atomic, rusty, cliff, shadow, law, patterns.

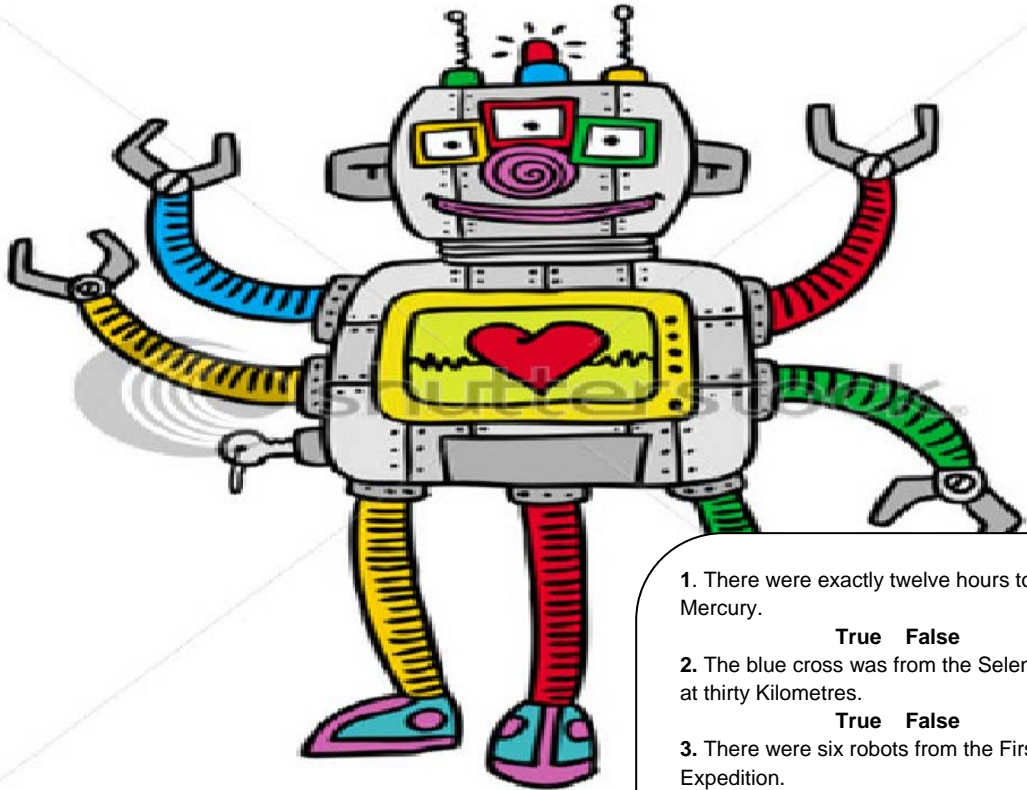
PROCEDURE:

1. Give each student a copy of the reading.
2. Ask students solve the exercise in pairs.
3. Decide if the statements are true or false.
4. Check and compare with their classmates.



Runaround

1. Circle (T) for true or (F) for False in each statement.



- 1. There were exactly twelve hours to Mercury.
True False
- 2. The blue cross was from the Selenium pool at thirty Kilometres.
True False
- 3. There were six robots from the First Expedition.
True False
- 4. The tunnel's temperature was at ninety centigrades.
True False
- 5. Speedy was the cheapest robot available.
True False
- 6. Powell felt metal fingers on his arm and heard a voice.
True False

Shutterstock. *Vectored cartoon robot.n.d.JPEG* file.

2. Give a personal opinion about robots.

.....

.....

.....

.....



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TITLE: Reason

TIME: 40-45 Minutes

PURPOSE: To solve the puzzle according to the reading.

BASIC ASPECT: Scanning and writing

MATERIALS: one hand out per each student.

KEY VOCABULARY: photoelectric eyes, beam, Earth, tiny, inhuman, machine, powerful, Mars, engine room, flashes, stiffly, storm, figures, Master, path.

PROCEDURE:


1. Give each student a copy of the reading.
2. Give students a handout for problem solving.
3. Ask students to work in pairs.
4. Solve the Puzzle.



REASON

1. Read the following cues and solve the puzzle based on the theme Reason.

	1						2												
3										4									5
6									7				8						
			9														10		
		11								12									
	13								14										
				15															
16																			
							17												
18							19												
20																			



Ecosistema digital. Inconfider. Sep 23, 2009. JGEP file.

ACROSS 

- 3. A brain which works by using positive electrons.
- 6. A small, round shape, a different colour from the surrounding area.
- 7. A large object in space which involves round a star.
- 9. A sign like the letter X.
- 10. To throw out the mouth with force.
- 12. A disturbance of the normal condition of the atmosphere.
- 13. A machine that changes something.
- 15. To keep safe.
- 16. A long narrow piece of metal.
- 17. The third planet in order from the sun.
- 19. To disturb or bother a person.
- 20. A very small planet.

DOWN 

- 1. A machine that can do some of the work of a human being.
- 2. A suit which keeps the body at the safe temperature.
- 4. A line of light or heat.
- 5. A religious fest day.
- 8. A force that works hard or enables machines to work.
- 11. The sun and the planets going round it.
- 14. A small moving part of an atom.
- 18. A sudden bright light.



TITLE: Catch that Rabbit

TIME: 50 Minutes

PURPOSES: Reading and writing

- ✓ To read and understand the text in order to write an acrostic with words from the text.
- ✓ Write some sentences using new words.
- ✓ Make a personal acrostic.

BASIC ASPECT: Reading and Writing.

MATERIALS: One handout per pairs.

KEY VOCABULARY: smooth, photoelectric, atomic engines, painful, dull, clever, frown, blindly.

PROCEDURE:

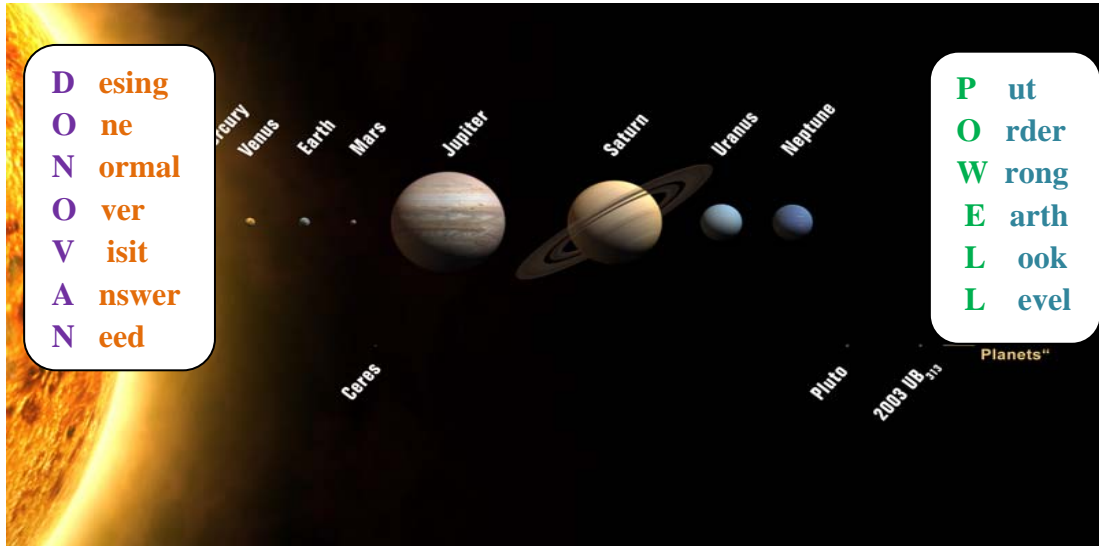
1. To give each student a copy of the reading.
2. Provide students with essential information.
3. Ask students to make an acrostic using new words.
4. Write sentences using new words from the acrostic.
5. Make a personal acrostic.



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CATCH THAT RABBIT

1. Choose some words from reading. Write some acrostics. Follow the sample.



International Astronomical Union. *Plutoides*. Agost 28, 2006. JGEP file.

2. Then make some sentences using every new word.

Example.

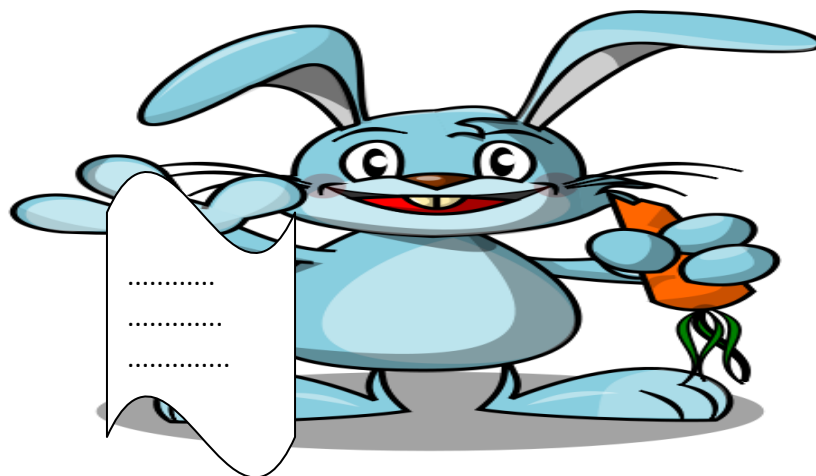
I **need** a robot to help me at home.

.....

.....

.....

3. Write a personal acrostic about you.



Focaclipar. *Conejos y huevos*. Apr 23,2009.JGEP file.



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TITLE: Liar!

TIME: 50 Minutes

PURPOSES:

- ✓ To read and understand the text.
- ✓ Try to remember some words from the text.
- ✓ To write about the favourite character.
- ✓ To give a personal opinion about lies.

BASIC ASPECT: Reading and Writing

MATERIALS: One handout per pairs.

KEY VOCABULARY: fault, sympathetic, banged, tools, unkindly, smooth, resigned, screamed, bitter.

PROCEDURE:

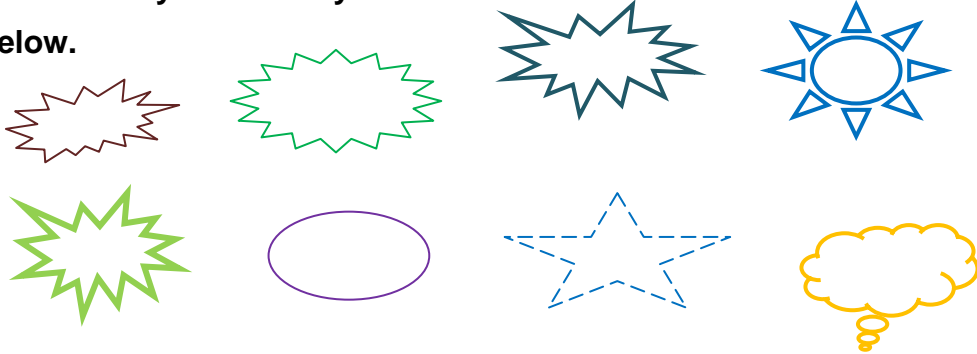
1. Give each student a copy of the reading.
2. Give students a handout with essential information.
3. Ask students to write as many words they remember from the passage.
4. Write a short paragraph about their favorite character from the reading.
5. Write a personal opinion about lying.



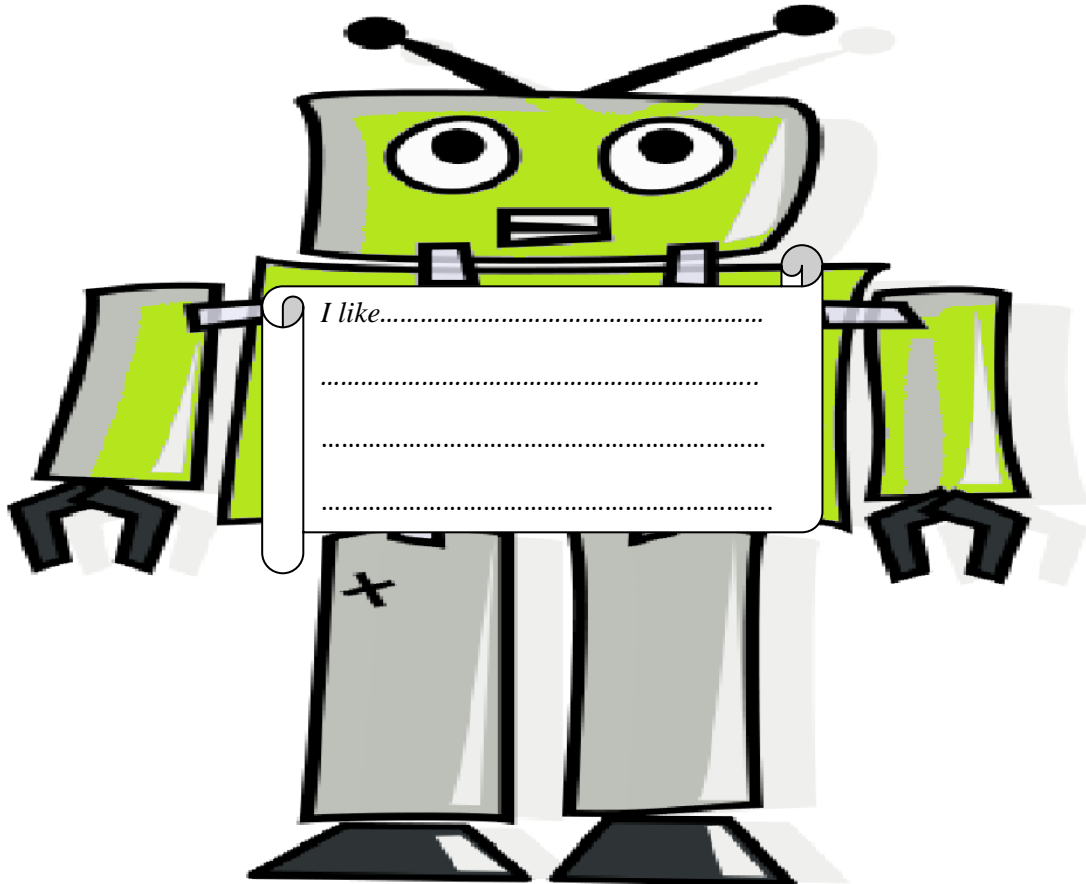
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LIAR

1. How many words do you remember about the "Liar" Write them below.



2. Make a description about your favorite character in "LIAR".



Cartoonpics. Robot Cartoons. n.d. PNG file.

3. Write a personal opinion about lying.

I think.....
.....
.....
.....

A



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TITLE: Little Lost Robot

TIME: 50 Minutes

PURPOSES:

- ✓ Find the mistake about the picture.
- ✓ To re-write a text.
- ✓ To chose the correct answer.

BASIC ASPECT: Writing and reading

MATERIALS: One handout per each student.

KEY VOCABULARY: atomic engines, asteroids, anxious, unbreakable, radiation, annoyed, exhausted, danger.

PROCEDURE:

1. Give each student a copy of the reading.
2. Give students a handout to do exercises based on the reading.
3. Ask students to re-write the sentences and choose the correct statement according to the picture.
4. Choose the correct answer according to the reading.
5. Check the answers.



Little Lost Robot

1. Re-write the sentences so that they match the picture. Then, write below.

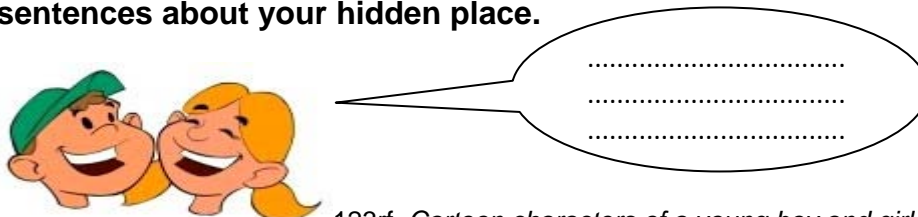
Yesterday, there were sixty three robots in their tiny wooden rooms. In the afternoon, there were sixty two robots. Nestor 10 was lost. Nobody saw him. Dr. Calvin was looking for him in the spaceship but she didn't find him. General Kallner saw him in the Mercury mine. He was playing with two dogs and a cat. Then, Mr. Black met him in the kitchen's room. He was washing the dishes. He was wearing sunglasses and his hand holding a spider.



Fig.13 Classroom Antics. *Robot Mascot Character*. Feb 3, 2011. JPEG file.

.....
.....
.....

2. Imagine you are "Nestor". Where can you hide? Write some sentences about your hidden place.



123rf. *Cartoon characters of a young boy and girl*.n.d.JPEG file.



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TITLE: Evidence

TIME: 50 Minutes

PURPOSES:

- ✓ To read and answer the questions.
- ✓ To ask students to write a personal opinion.
- ✓ Classify the words.

BASIC ASPECT: Reading Comprehension

MATERIALS: One handout per each student.

KEY VOCABULARY: deeply, politician, solar system, calmly, wheelchair, nod, laughter, x-ray.

PROCEDURE:

1. Give each student a copy of the reading.
2. Give students a handout to answer the questions based on the reading.
3. Ask students to write a personal opinion.
4. Enlist the words according the instructions
5. Check and share the answers.



Evidence

1. Read the text and answer the following questions.

- ✓ Why did the policemen arrive Byerley's house?

.....
.....

- ✓ What did Byerley say about him?

.....
.....

- ✓ Why did Dr. Calvin like robots better than human beings?

.....
.....

2. Read carefully the text and write an opinion about this paragraph. Do you agree or disagree with Dr. Calvin?



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The psychologist said. 'I like robots better than I like human beings. I'd like to see a robot governing the world. He'd be unable to harm human beings and so he'd govern better than any human being. Because of the Laws of Robotics, a robot could never be cruel, stupid or unjust. It would be the perfect answer to the problems of government.'



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A purple wavy-edged box with three horizontal dotted lines for writing.

3. Classify the verbs, nouns, adjectives from the text. Make a list.



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Those people who opposed the development of robots demanded new laws, and public anger began to grow. There were guards with guns around every US Robots office and factory, and police protection for Byerley day and night. Reporters and photographers waited outside Byerley's house, and interviewed scientists from US Robots. Soon, a city official with two policemen arrived to search Byerley's home.



Past tense verbs	Nouns	Adjectives

TITLE: I, robot

TIME: 50 Minutes

PURPOSES:

- ✓ To design a blog in order that students can write a about the novel.
- ✓ Give a personal opinion about the novel.
- ✓ Give their opinion about science and technology.
- ✓ Put some pictures related with the novel.

BASIC ASPECT: To design a blog.

MATERIALS: a computer, internet, an account in Hotmail or Gmail, creates an account in blogger, pictures and information.

KEY VOCABULARY: Copy, paste, save as, download, continue, insert.

PROCEDURE:

1. Give students some steps in order to create an account in Hotmail or Gmail.
2. Ask students to create a account in blogger
3. Ask students to write short summary about the novel and write it on the blog.
4. Give their personal opinions.
5. Insert pictures related with the novel on blog.
6. Personalize the blog.
7. Publish the blog.



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BLOG

1. Create a account in gmail or hotmail.

2. Following steps for creating a blog.

Step 1

- ✓ Go to <http://blogger.com> Click on the arrow labeled "Create Your Blog Now".
- ✓ Next screen will ask you to choose a user name and password.
- ✓ Enter an email address and to read and check the "acceptance of terms" of service agreement.

Step 2

- ✓ Hit continue and move on to Name Your Blog.
- ✓ Choose a good name for your Blog. Sometimes it reflects the topic of your blog.
- ✓ Choose the beginning part of your blog address – again make sure it makes sense with your blog theme/topic.
- ✓ There will be a scrabbled word for you to "uncode" and type in.
- ✓ This is just to verify you aren't a spammer! There is a choice for advanced settings.

Step 3

- ✓ Hit the continue arrow again,
- ✓ The next page helps you choose your design, style template.
- ✓ Choose the custom look (which you can always change later) and hit continue.

Step 4:

- ✓ You have now created a blog.
- ✓ Personalize the work for you.
- ✓ Try posting a message to test it out and view your first blog's post.
- ✓ Begin to write.



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CONCLUSION

The conclusion of this proposal, I want to say that these kinds of novels are tools for the learning-teaching process because they involve the two skills reading and writing. Teachers also can incorporate the Whole Language approach in the classroom. It helps students to be more active, give their opinions, give a point of view about different topics, be well-organized. It provides the prospect to learn new structures, vocabulary, punctuation, using their context or in their real lives.

This proposal is a model to follow when teachers use books or text related with literature because it contains a variety of themes such as love, drama, science and so on...these novels provide students a great amount of new vocabulary and grammar structures. We as teachers should motivate students to read and write more every day.

I'd like to suggest that English teachers to strengthen the two skills reading and writing because they are both the core and the final product of language. We as teachers should motivate students to read and write more every day.

- ✓ Using new approaches, methodologies and incorporating technology in the classroom. It makes the class more remarkable and meaningful.
- ✓ Choosing appropriate resources and materials, according to students' interests, and their environment and background.
- ✓ Giving learners the opportunity to be creative, reflexive, collaborative, and critical in the classroom.

Finally, I recommend that my colleagues use all resources, materials, technology, and Methodologies appropriate for students. They should give a quality education and changed the way of thinking about their students, and the teachers – students role. Nowadays, our role is as a guide for them, one helps construct their knowledge in a meaningful way using their real life and context.



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APPENDIX



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GLOSSARY

Susan Calvin

Clumsy (*adj*) a terribly clumsy fellow.

Colourless (*adj*) lacking distinctive character or interest; dull.

Expedition (*n*) a journey or voyage undertaken by a group of people with a particular purpose, especially that of exploration, scientific research, or war.

Mercury (*n*) (Astronomy) a small planet that is the closest to the sun in the solar system, sometimes visible to the naked eye just after sunset.

Mines(*n*) an excavation in the earth for extracting coal or other minerals.

Plain (*adj*) not decorated or elaborate; simple or ordinary in character.

Psychologist (*n*) an expert or specialist in psychology.

Robot (*n*) A machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer.

Runaround

Atomic (*adj*) using the energy that comes from breaking up atoms.

Bank (*n*) a slope, mass, or mound of a particular substance.

Bitterly (*adj*) (of people or their feelings or behavior) angry, hurt, or resentful because of one's bad experiences or a sense of unjust treatment.

Cliff (*n*) a high steep face of a rock.

Insosuits (*n*) a suit which keeps the body at the safe temperature.

Law (*n*) any written or positive rule or collection of rules prescribed under the authority of the state or nation.

Patterns (*n*) a distinctive style, model, or form.



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Photocell (*n*) a solid-state device that converts light into electrical energy by producing a voltage, as in a photovoltaic cell, or uses light to regulate the flow of current, as in a photoconductive cell.

Positronic brains (*n*) a brain which works by using positive electrons.

Rush (*v*) to cause to move, act, or progress quickly; hurry.

Rusty (*adj*) covered with or affected by rust.

Shadow (*n*) a dark figure or **image** cast on the ground or some surface by a body intercepting light.

Sort (*n*) a particular kind, species, variety, class, or group, distinguished by a common character or nature.

Sun side (*n*) Flickr is almost certainly the best online photo management and sharing application in the world.

Wild (*adj*) (of an animal or plant) living or growing in the natural environment; not domesticated or cultivated.

Reason

Beam (*n*) any of various relatively long pieces of metal, wood, stone, etc., manufactured or shaped especially for use as rigid members or parts of structures or machines.

Earth (*n*) the third planet in order from the sun. The inhabitants of this planet, especially the human inhabitants.

Engine room (*n*) a place where engines are housed, especially on a ship.

Figure (*n*) form or shape, as determined by outlines or exterior surfaces.

Flash (*n*) a brief, sudden burst of bright light.

Inhuman (*adj*) lacking qualities of sympathy, pity, warmth, compassion, or the like; cruel; brutal.



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Machine (*n*) an apparatus consisting of interrelated parts with separate functions, used in the performance of some kind of work.

Mars (*n*) the fourth planet in order from the sun.

Master (*n*) a person with the ability or power to use, control, or dispose of something

Path. (*n*) a way beaten, formed, or trodden by the feet of persons or animals.

Photoelectric (*adj*) pertaining to the electronic or other electric effects produced by light.

Powerful (*adj*) having or exerting great power or force.

Stiffly (*adj*) rigid or firm; difficult or impossible to bend or flex.

Storm (*n*) a heavy fall of rain, snow, or hail, or a violent outbreak of thunder and lightning, unaccompanied by strong winds.

Tiny (*adj*) very small; minute; wee.

Catch that Rabbit

Smooth (*adj*) free from projections or unevenness of surface; not rough.

Painful (*adj*) affected with, causing, or characterized by pain

Dull (*adj*) causing boredom; tedious; uninteresting

Clever (*adj*) mentally bright; having sharp or quick intelligence; able.

Frown (*v*) to contract the brow, as in displeasure or deep thought; scowl.

Blindly (*adv*) in a blind manner

Liar!

Fault (*n*) responsibility for failure or a wrongful act.

Sympathetic (*adj*) characterized by, proceeding from, exhibiting, or feeling sympathy; sympathizing; compassionate



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Bang (*n*) a loud, sudden, explosive noise, as the discharge of a gun

Tool (*n*) an implement, especially one held in the hand, as a hammer, saw, or file, for performing or facilitating mechanical operations.

Unkindly (*adj*) not kindly; unkind

Scream (*v*) to utter a loud, sharp, piercing cry.

Bitter (*adj*) having a harsh, disagreeably acrid taste, like that of aspirin, quinine, wormwood, or aloes.

Little Lost Robot

Asteroid (*n*) Also called minor planet.

Anxious (*adj*) full of mental distress or uneasiness because of fear of danger or misfortune; greatly worried; solicitous.

Unbreakable (*adj*) not able to be broken.

Radiation (*n*) the process in which energy is emitted as particles or waves.

Annoyed (*adj*) made angry.

Exhaust (*v*) to drain of strength or energy, wear out, or fatigue greatly, as a person.

Danger (*n*) liability or exposure to harm or injury; risk; peril.

Evidence

Deeply (*adv*) at or to a considerable extent downward; well within or beneath a surface.

Politician (*n*) a person who is active in party politics.

Solar system (*n*) the sun together with all the planets and other bodies that revolve around it.

Calmly (*adj*) without rough motion; still or nearly still.



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Wheelchair (*n*) a chair mounted on wheels for use by persons who cannot walk.

Nod (*v*) to make a slight, quick downward bending forward of the head, as in assent, greeting, or command.

Laughter (*n*) the action or sound of laughing.

X-ray (*n*) a form of electromagnetic radiation, similar to light but of shorter wavelength and capable of penetrating solids and of ionizing gases.

I, Robot

Copy (*v*) to make a copy or copies.

Paste (*v*) to insert (copied text, images, etc.) into a file.

Save (*v*) to copy data to a more permanent form of storage.

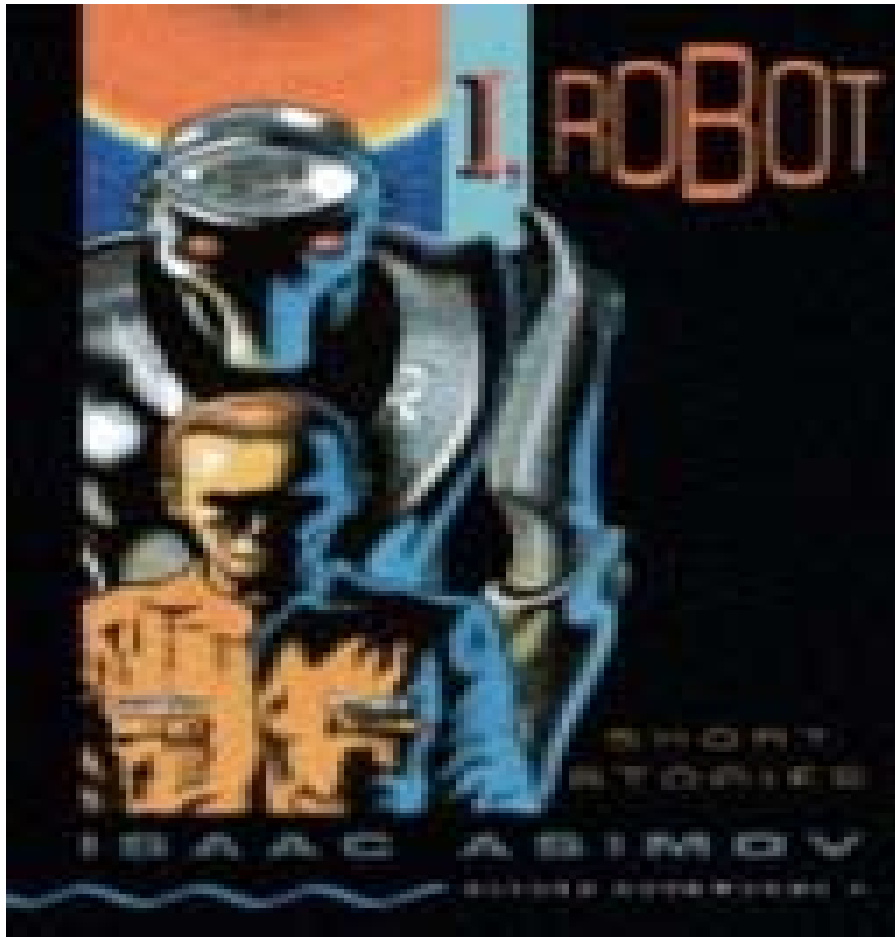
Download (*v*) to transfer (software, data, character sets, etc.) from a distant to a nearby computer, from a larger to a smaller computer, or from a computer to a peripheral device.

Continue (*v*) to go on or keep on, as in some course or action; extend.

Insert (*v*) to put or place in.



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Oxford University
Press, 1993 ISBN 0194226859, 9780194226851. *I, Robot*.
1993. Microsoft Word file.

The Three Laws of Robotics

1. A robot must not injure a human being, or allow human being to come to harm.
2. A robot must obey the orders given by human beings unless they conflict the First Law.
3. A robot must protect itself as long as such protection does not conflict with the First or Second Laws.

Book of Robotics, 56th edition, 2058 A.D.



DR SUSAN CALVIN

I looked at my notes and didn't like them. I'd spent three days at the United States Robots Company, its offices and Factories like a small city, and needed more personal information for my newspaper. And so I went to interview Dr. Calvin.

Susan Calvin had been born in the year 1982. At the age of twenty she had met Dr Alfred Lanning of US Robots who had shown her first robot with a voice. It was a large, clumsy ugly robot which was going to be sent to the mines on Mercury.

Susan was a cold girl, plain and colourless, who disliked the world around her. But as she watched and listened to the robot, she felt the beginning of a cold excitement. In 2008 she completed her final degree at Columbia University, and began work at US Robots as the first robot Psychologist.

For fifty years she watched the development of robots- and now she was leaving US Robots at the age of seventy-five.

'My newspaper reaches the whole solar system,' I said to Dr Calvin. 'We have three billions readers, Dr Calvin. They would like to hear your views on robots.'

Dr Calvin didn't smile at me. I don't think she ever smiled. She was small and thin and her eyes were sharp, though not angry.

AUTORA: Marixa Maldonado Pérez

'How are you?' she wanted to know.

'thirty-two,' I said.

'Then you don't remember a world without robots,' Dr Calvin began. 'There was a time when a human begins faced the world alone and without a friend. Now we have robots to help us – stronger, more useful, and more capable that we are. Human beings are no longer alone. Have you ever thought of it that way?'

'I'm afraid I haven't.'

'To you, a robot is a robot. Made by humans and, if necessary, destroyed by humans. But you haven't worked with them, so you don't know them. They're cleaner, better creatures that we are. In the beginning, of course, robots couldn't talk. Afterwards, they became more human. But it took US Robots a long time. The first robots sent out to Mercury failed. If you want to know about the second expedition, young man, I advised you to visit George Powell. He's still living in New York - he's a grandfather now. But in those he and Michael Donovan were engineers who were given our most difficult cases.'

'I can visit Mr. Powell later.' I agreed. 'But please tell me what you remember now.'

She spread her thin hands on her desk and looked at them. 'there are two or three of their cases that I know about.' she said.



‘Start with Mercury.’ I suggested.

‘Well, I think that the Second Mercury Expedition was sent out in 2015. It consisted of two engineers – Gregory Powell and Michael Donovan – and a new robot, the SPD robot...’

RUNAROUND

Mike Donovan, his red hair wild, rushed down the stairs towards Greg Powell. ‘what have you been doing in the sublevels all day?’ he asked feverishly. He paused. ‘Speedy hasn’t come back.’

Greg Powell stopped on the stairs. ‘You sent him after selenium?’

‘Yes.’

‘And how long has he been outside?’

‘Five hours now.’

Silence. What a situation! Here they were, on Mercury exactly twelve hours, and already in the worst sort of trouble.

They went up the stairs and into the radio room, untouched for ten years. The equipment was out of date and the room looked depressing.

Powell said, ‘Start at the beginning, Mike, and let’s get this straight.’

AUTORA: Marixa Maldonado Pérez

‘I tried to speak to him by radio, but radio isn’t any good on the Mercury Sunside. That’s one of the reasons the first Expedition failed. I followed his position for two hours look - at the map.’

Donovan threw the map on to the table. ‘The Red Cross is the selenium pool – thirty Kilometers away. The blue crosses show Speedy’s position.’

For the first time Powell looked worried. ‘Are you serious? This is impossible.’

‘There it is,’ said Donovan.

The blue crosses made a circle around the red cross of the selenium pool. Powell’s fingers touched his brown moustache, a sign of his anxiety.

‘In the two hours I watched him,’ Donovan added, ‘he went round that pool four times. He seems likely to continue for ever. Do you realize the position we’re in, Greg?’

Paul said nothing. Oh, yes, he realized the situation they were in. The photocell banks in the wall and roof, which alone protected from the full heat of Mercury’s terrible sun, were badly damaged. The only thing that could save them was selenium. The only thing that could get the selenium was Speedy. If speedy didn’t come back, there would be no selenium. No selenium, no photocell banks. No photocell banks – well, death by slow boiling is not a pleasant way to die.



Donovan rubbed his red hair and spoke bitterly. 'How can everything have gone wrong so soon? The great team of Powell and Donovan sent to Mercury to repair the Sunside Station. A routine job. And we failed on the first day. We'll be in trouble for this.'

'We'll be in worse trouble here,' said Powell quietly, 'if we don't do something quickly.'

'Well, what are you going to do?' Donovan looked at Powell eagerly. 'Come on, Greg. You've got an idea, haven't you?'

'We can't go after Speedy ourselves, Mike – not on the Sunside. Even if we wear the new insosuits, they won't protect us for more than twenty minutes in direct sunlight. But we've got six robots down in the sublevels. Maybe we can use them, if they still work.'

There was suddenly hope in Donovan's eyes. 'Are you sure? Six robots from the First Expedition? But that was ten years ago.'

'Well, they've got positronic brains – very simple ones, of course.' He put the map in his pocket. 'Let's go down.'

The robots were on the lowest sublevel. All six of them were extremely large, over three meters tall.

Donovan whistled. 'Look at them! The chest must be three meters around.'

'Old machinery,' Powell exclaimed. 'I've examined them - they may talk.'

Powell took an atomic battery from his pocket and put it into the chest of one of the robots. 'You! Do you hear me?'

The robot's head bent slowly and the eyes looked at Powell. 'Yes, Master!' its voice sounded rusty and tired.

'Can you go outside? In the light?'

The robot's brain worked slowly. 'Yes, Master.'

'Well will take you upstairs and outside the station. You will go about thirty kilometers and you will find another robot, smaller than yourself. You will order him to return. If he doesn't wish to return, you must bring him back by force.'

'Yes, Master.'

'All right. Follow me.'

The robot didn't move. 'I cannot. You must ride me.'

Powell stared and pulled his moustache. 'An old robot... Of course! He can't move without human control. Someone has to ride him like a horse. What do we do now?'

'We can't go thirty kilometres outside, with a robot or without.' Donovan said. 'Wait a minute. Give me that map! This is a mining station. What's wrong using the tunnels?'



Donovan studied the map. The mining station was a black circle, and black lines showing the tunnels stretched out from it. 'Look, we can come out here, at exit 13A, five kilometres from the selenium pool.'

'Right. Get your insosuit,' Powell said.

It was the first time they had worn the insosuits. They were light, but big and ugly. A human being wearing an insosuit could survive the sun of Mercury for twenty minutes.

'Are you ready to take us to exit 13A?' Powell asked the robot.

'Yes, Master.'

Powell climbed up on to one robot and Donovan got up on another. There were seats on the backs of the robots, and two long ears to hold on to. The two huge robots moved through the door and along a narrow passage into the tunnel. They moved slowly, at a speed that never varied: they were unable to hurry.

After a time, they came to the end of the tunnel and they went up some stairs to a tiny substation, empty, airless. A tall cliff of back rock cut off the sunlight, and the deep night shadow of an airless world enclosed them. Before them, the shadow of the cliff reached out and ended suddenly in a hard line, before the blinding white light of Mercury Sunside.

Donovan looked at the instruments on his wrist. 'The temperature is eighty centigrade!' He stared out over the broken, rocky ground. 'See anything?'

'There's a dark area over there that may be the selenium pool. But I don't see Speedy.'

Donovan stood up on his robot's shoulders. 'I think...Yes there he is. He's coming this way!'

'I see him!' shouted Powell. 'Let's go!'

The robots began to move.

'Faster!' shouted Donovan.

'No use!' cried Powell. 'These robots can move at only one speed.'

They moved out from the shadow of the cliff, and the sunlight poured down white-hot around them.

'Keep your eyes on Speedy, Mike,' Powell said. 'It's going to get better.'

Robot SPD- 13 ran easily across the broken ground. SPD robots were the fastest robots produced by the United States Robots Company. They were built for the low gravity, the fierce temperatures and the broken ground of mercury.

'Speedy!' shouted Powell into his radio. 'Come here!'



Speedy looked up and saw them. He stopped suddenly and remained standing for a moment. Then he turned and ran away, kicking up dust behind him. Over their radios, Donovan and Powell heard him singing a song.

Donovan said weakly, 'Greg, he's crazy.'

'He is not crazy,' Powell said. 'A robot's only a robot. There's something wrong with him that's confusing his brain patterns. Once we find out what it is, then we can fix it.'

The two men went back into the shadow of the cliff and got down from their robots.

'What did you say to Speedy when you sent him for the selenium?' Powell asked. 'Did you tell him that it was urgent? Important?'

'No,' Donovan replied. It was just a routine order. I just told him that we needed some selenium and that he should go and get it.'

'Right,' said Powell. 'Well, let's start with the Three Laws of Robotics that are built into the robot's positronic brain. First, a robot must not injure a human being, or allow a human being to come to harm. Second, a robot must obey the orders given by human beings unless they conflict with the First Law. Third, a robot must protect itself, unless this conflicts with the First or Second Laws.'

'And how does that help us?'

Speedy is one of the most expensive robots available. To protect the SPDs, their brains were made a little differently: the Third Law was built more strongly than is usually done. Perhaps there's a danger at the selenium pool which Speedy is avoiding.'

'What danger?'

'Well, where does the selenium come from?'

'It's produced after a volcano has been active,' Donovan said quickly.

'That's it! Maybe there's some gas above the selenium pool, escaped from underground, which is a risk to Speedy. Perhaps carbon monoxide. At this temperature, it could combine with the iron parts of Speedy's machinery and cause him to explode.'

Donovan nodded. 'The Third Law drives him to back from the pool, and then when he gets away from the pool, the Second Law drives him forward towards the pool again. And unless we can find a way to stop him, he'll go on going that – giving us the runaround.'

There was silence. They had to think fast!

'There's always the First Law,' Powell said at last.

Donovan looked up.



'We're desperate,' Powell said. 'A robot can't watch a human being in danger without helping. I'm going out there now to see what the First Law will do.'

'Wait, Greg!' Donovan Protested. 'You can't go out there into the sun just that. We must choose which of us...'

But Powell, on his robot, was off into the sunlight. The old robot moved slowly towards Speedy, who was near the selenium pool. It seemed a long way. When Powell was three hundred metres away, he got down from the old robot and continued on foot. He felt the heat of the rocks through the boots of his insosuit, and he moved with difficult because of the low gravity. He looked over his shoulder once at the blackness of the cliff's shadow and realized that he had come too far to return now. More than ten minutes had passed!

'Speedy!' Powell called anxiously into his radio, when he got near enough. 'I must get back to the shadow or the sun will kill me. It's life or death, Speedy. I need you.'

Speedy stopped, but didn't turn. Powell saw a movement out of the corner of his eye.

'Master, you are in danger,' a slow voice said.

Powell turned quickly and stared in surprise at the huge old robot moving towards him.

'I must not move without a Master on me, but you are in danger.'

Of course! The First Law came before anything else. But Powell didn't want the old robot: he wanted Speedy. 'Stay away!' he shouted urgently at the old robot. 'I order you to stay away!'

It was quickly unless: you could not beat the First Law. The robot said stupidly, 'You are in danger, Master.'

Powell looked about him desperately. The sun was burning through his insosuit and he was breathing with difficulty. The ground all around him seemed to move in the heat; he couldn't see clearly.

He called again, desperately, 'Speedy! I'm dying Speedy, I need you!'

Suddenly, he felt metal fingers on his arm and heard a worried. Metallic voice in his ears. 'Boss, what are you doing here? And what am I doing? I'm so confused - '

'Never mind,' Powell whispered weakly. 'Get me into the shadow of the cliff – and hurry!'

*

Powell woke to see Donovan bending over him and smiling anxiously. 'How are you, Greg?'

'Fine! Where's Speedy?'



‘Right here,’ Donovan said. ‘I sent him out to one of the other selenium pools. This time I explained that it was essential to get that selenium urgently. He got it back in forty - two minutes. He ´s still apologizing for the runaround he gave us.’

Powell put out his hand and held Speedy´s metal fingers for a moment. ‘It´s OK, Speedy.’ Then he rubbed his face.

The air was beautifully cool! ‘You know, Mike, when we finish here, they´re going to send us to one of the space stations-’

‘No!’

‘Yes! That´s what Dr. Calvin told me. I was going to fight the idea. But it´s all right with me now. 273 centigrade below zero. Won´t it be pleasant?’

REASON

Half a year later, the boys had changed their opinion. The flame of a huge sun had been changed for the cold blackness of space. But although the black ground had changed, Powell and Donovan were again faced with a positronic brain which did not work properly. They discovered that soon after they arrived at the station.

Gregory Powell spoke slowly. ‘One week ago, Donovan and I made you.’ He frowned as he stared at Robot QT- 1, and pulled his brown moustache.

AUTORA: Marixa Maldonado Pérez

It was quiet in the officers’ room of Solar Stations 5. Robot QT-1 sat immovable. His metal body shone and his red photoelectric eyes were fixed on the man at the other side of the table.

Powell felt a sudden attack of fear. These robots had peculiar brains. The three Laws of Robotics were there – there was no question of that. So QT-1 was safe. And yet- the Qt robots were the first of their kind.

Finally, the robot spoke, in his cold, metal voice. ‘Do you realize the seriousness of your remark, Powell?’

‘*Something* made you, Cutie,’ said Powell. ‘You admit that your memory begins a week ago. I´m giving you the explanation. Donovan and I made you, using the parts which were sent to us from Earth.’

Cutie stared at his long, capable fingers. ‘There should be better explanation. It seems improbable that *you* made *me!* I intend to discover who made me. If I use reason, then I shall discover the truth.’

Powell stood up and put his hands on Cutie´s metal shoulder. It was cold and hard. ‘Cutie, I´m going to try to explain something to you. You´re the first robot who has ever been curious about himself- and about the outside world. Come with me.’

The robot stood easily and smoothly and followed Powell. Powell touched a button and a square piece of the wall



opened. Through the thick, clear glass they saw space, with its hundreds of stars.

‘I’ve seen that through the windows in the engine room,’ said Cutie.

‘What do you think it is?’ asked Powell.

‘A black material with tiny shining dots on it. I know that our director sends beams to some of those shining dots, always the same dots – and also that dots move.’

‘Good!’ Powell said. The blackness isn’t material, it’s an enormous emptiness, and those tiny silver dots are huge, some of them are millions of kilometres across. They look tiny only because they are so far away from us.’

Cutie continued to stare through the window. ‘Which particular dot is Earth?’

Powell searched. ‘There it is. The very bright dot in the corner. That’s Earth. There are three millions human beings there, Cutie – and next week I’ll be back there with them.’

‘But you haven’t explained *me* Powell.’

‘It’s simple,’ Powell said. ‘The solar stations like us, feed solar energy to earth and the other planets. We take energy from the sun and send it to Earth in a very powerful energy beam. However, it’s difficult for humans to work on the solar stations because of the cold and because of the electron

storms. So robots were developed to do the work of human workers, and now only two humans are needed at each station. We’re trying to develop robots which can do the work of those two humans. You’re the highest type of robot ever made. And if you can control this station independently, then no human will need to come here again, except to bring parts for repair.’

The robot’s red eyes stared at Powell. ‘You expect me to believe that complicated explanation? Enormous emptiness! Three millions human beings!

Sorry, Powell, but I don’t believe it.’ He turned and walked out the room.

He passed Michael Donovan at the door without a word. Donovan rubbed his red hair. ‘What doesn’t he believe?’ he asked Powell.

Powell pulled his moustache. ‘He doesn’t believe that we made him. He doesn’t believe that there are stars and planets and space. He’s going to investigate everything himself.’

Donovan was annoyed. ‘Well, I hope he’ll explain it all to me. I don’t like him, anyway – he asks too many questions.’

*

Cutie knocked gently and entered. ‘Is Powell here?’



Mike Donovan spoke from behind a large chicken sandwich. 'He's collection information – we think that we're moving into the electron storm.'

As he spoke, Gregory Powell came into the officers' room. 'Yes, I think a storm is on its way. But the information isn't exact, and I don't know what to expect. Oh, hello, Cutie. I thought you were working on the new drive bar.'

'I've finished,' the robot said quickly.' And so I've come to talk to you. I've been thinking for two days about who made me. I can't believe that you two humans made me.'

Donovan turned angrily towards Cutie, but Powell put out his hand. 'Why do you say that Cutie?'

Cutie laughed. It was an inhuman laugh – sharp and regular. 'Look at you! The material you are made of is soft and weak. You depend upon food like that- he pointed at Donovan's sandwich - 'to give you energy. Each day you need to sleep and while you're asleep you can do nothing. And if the temperature varies too much, you can't work. You are a very inefficient and short- lived piece of equipment.' The robots paused. 'I, on the other hand, am a perfect and efficient machine. I use electric energy directly. I'm made of strong metal. I never sleep. And I can work in any temperature. You can't possibly have made me. Obviously no being can create another one of much higher quality than itself.'

Donovan jumped up. 'All right, you piece of metal, if we didn't make you, who did?'

'Very good, Donovan,' Cutie said seriously. 'that's was in fact the next question. My creator must be more powerful than myself, and so there was only one possibility.'

Donovan and Powell looked puzzled.

Cutie continued. 'What is the centre of the solar station? What do we all serve?'

Donovan looked at Powell, surprised. 'I think that this metal fool is taking about the Energy Converter.'

'I'm talking about the Master,' came the cold, sharp answer.

Donovan and Powell both laughed. Cutie stood up, and his eyes stared at them. 'you're not staying here much longer. The Master created humans first, as the lowest type, then robots, and finally he has created me, to take the place of humans. From now on I serve the Master.'

'On no you don't,' Powell said sharply. 'You'll follow our orders and keep quiet until we're confident that you can control the Converter. The *Converter* – not the Master.'

Cutie left the room without another word. Donovan sat back in his chair and pushed his fingers through his hair. 'There's going to be trouble with a robot. He's crazy!' *



The noise of the Converter was very loud in the control room. Donovan looked at the instruments. 'The beam from Solar Station 4 reached Mars punctually.'

Powell nodded. 'I'm worried about these figures. We're in a bad position for an electron storm. It could run directly into the path of our Earth beam. Mike, go down and check that Cutie's all right in the engine room.'

'OK.' Donovan got into the lift and went down to the engine room. Here, the noise from the huge engine was even louder. From a high platform at the back of the room, Donovan watched the robots working silently. Suddenly, they all stopped and knelt in a line in front of the Converter. Cutie walked slowly up and down the line.

Donovan gave a loud shout and rushed down the narrow stairs. 'What are you doing, you brainless bits of metal!'

Not a robot moved. Cutie remained silent, his eyes fixed on the huge Converter.

Donovan pushed the nearest robot. 'Stand up!' he shouted.

Slowly, the robot obeyed. 'There is only one Master, and Cutie is his messenger.'

The other robots repeated: 'There is only one Master, and Cutie is his messenger.'

'Is that right?' Donovan said angrily. 'Well let me tell you something. There isn't any Master; and I'm the one giving orders around here. Understand? Now get out!'

'I obey only the Master.'

'Nonsense!' Donovan shouted. He turned his head and spat at the Converter. 'That *think* is a machine. There isn't any Master, and there isn't any messenger. *You obey me!*'

The robots were silent and their red eyes stared at Donovan.

'How dare you spit at the Master.' whispered Cutie. He moved forwards slowly and purposefully, and Donovan felt a sudden rush of fear. A robot could not feel anger – but Cutie's eyes were unreadable.

'I 'm sorry, Donovan,' said the robot, 'but you can't stay here after this. You and Powell can no longer enter the control room and the engine room.'

Cutie's hand moved quietly and in a moment two robots had lifted Donovan from the floor and carried him up the stairs.

*

Two robots guarded the door of the officers' room. Inside, Donovan was still angry. 'Those robots must obey us! It's the Second Law!'



‘But they *aren’t* obeying us,’ Powell said. ‘And what’s going to happen when the electron storm hits us? Do you know that it’s moving directly towards the Earth beam? I’ve just finished checking the figures. With only Cutie at the controls, God help Earth – and us! We’ll be back to the Mercury mines for twenty years!’

Suddenly, Cutie entered in the room and closed the door gently. ‘Please don’t be annoyed. Until I was created, you looked after the Master. You have served him well, and he will remember that I shall provide you with everything you need while you are live. But you must stay out of the control room and the engine room.’

They tried to argue with him, but Cutie believed that only his explanations were right. As for the energy beam to Earth, his explanation was simple: ‘It is the Master’s wish. We must not question it.’

At last, Powell sat down and buried his face in shaking hands. ‘Get out of here. Cutie. Get out of here, and let me think.’

‘I’ll send you food,’ said Cutie kindly. And left the room. ‘Greg, we must get rid of him somehow,’ Donovan whispered. ‘Burn out his electric circuits or -’

Powell shook his head. ‘We’ll never get near enough to do that. We must argue with him. We must get back in the control room before tomorrow.’

AUTORA: Marixa Maldonado Pérez

Suddenly, Donovan laughed. ‘Why argue? Let’s show him! Let’s build another robot! He’ll have to change his mind when he sees that.’

Cutie agreed to come with them to the engineers’ work-room where the robot parts sent from Earth were kept. It was a complicated and difficult job. For three hours, Cutie sat, silent and stiff, and watched Powell and Donovan creating a simple robot.

‘Let’s get the brain in now, mike!’

Carefully, Donovan removed the positronic brain from its container. It fitted exactly inside the robot’s head. The metal closed over it. The photoelectric eyes were attached and covered by thin sheets of plastic.

Powell paused. ‘Now watch this, Cutie. Watch carefully.’

Powell turned on the electricity and the robot began to move.

‘I would like to start work. Where must I go?’ it asked slowly.

Donovan opened the door. ‘Down these stairs.’ He said. ‘You will be told what to do.’

The robot went, and Donovan and Powell turned Cutie.

‘Well?’ Powell asked, smiling. ‘Now do you believe that we made you?’



Cutie's answer was short and final. 'No!' he said. 'You put the robot together, but you didn't create the parts. The Master created the parts.'

Donovan's mouth dropped open. 'Listen!' he gasped. 'Those parts were made on Earth and sent here. If you read the books in the library they'll explain it all.'

'I've read them – all of them,' replied Cutie gently. 'They, too, were created by the Master – and he intended them for you, not for me. We won't argue. Your brains are probably too weak to understand the whole truth. But the Master remembers you poor humans, and will too after you if you do your duty well.'

And Cutie left the room quietly. With the calm with the confidence that comes from knowing the truth. The two humans avoided each other's eyes.

*

Twelve hours later the storm arrived. Helpless and white-faced with anxiety, Donovan and Powell stared out of the window at the bright flashes of light caused by the high-speed electrons hitting the energy beam. The beam looked straight, but they knew that any change in direction, even for a hundredth of a milli-second - invisible to the eye – would destroy hundreds of kilometres of Earth.

And a robot, who did not care about Earth, or the purpose of the beam, or anything except his Master, was at the controls.

Hours passed. Silently, the humans watched. And then the flashing dots of light slowly disappeared. The storm had ended.

Powell's vice was low. 'It's over!'

Cutie walked in. 'Would you like to see some of the figures we received today?'

Dull of unhappiness, Powell realized that the robot was trying to be friendly. He accepted the sheets of paper from Cutie and looked at them mechanically. He stared – and stared again. Then he jumped to his feet, the sheets of paper dropping to the floor. 'Mike! He did it! He kept the beam straight all through the storm!'

Donovan, too, stared at the figures, and then at Cutie. 'You did it! You directed the beam exactly at the receiving station on Earth!'

Cutie turned away, annoyed. 'Always the same nonsense. I only kept the machine absolutely accurate, since it is the wish of the Master.'

Cutie left the room stiffly, and the two men looked at each other. 'What are we going to do now?' Donovan asked.



‘Nothing. He can control the solar station perfectly. I’ve never seen a storm managed so well. He’s keeping us out of the control room because he knows that he looks after the Converter and the energy beam better than we do.’

‘But we can’t let him continue this nonsense about the Master.’

‘Why not? He can control the station. What does it matter what he believes?’

*

Powell and Donovan were going to back to Earth. The ship had arrived with the new two men, Frank Miller and Sam Evans.

‘How’s Earth?’ Powell asked.

‘Still turning,’ Miller said. ‘There’s a new robot at US Robots – a master robot which controls six others. You’re going to test it. I hear.’ He gave them cold, unfriendly smile.

Powell frowned. ‘We need a holiday.’

‘Oh, you’ll have one. Two weeks, I think.’

Powell’s frown deepened. ‘Is that all?’ he seemed to like the idea, Powell thought

Miller smiled again. He seemed to like the idea, Powell thought, of the shortness of the holiday.

Miller took off his space coat. ‘How’s this new robot? I hope it’s good, or I won’t allow it to touch the controls.’

Powell paused. He looked at Miller, at his neat hair and stiff expression. A sudden rush of gladness shot through him. ‘The robot is rather good,’ he said slowly. ‘You won’t need to spend much time at the controls.’

He smiled, and went into the space ship. Miller would be here for several weeks...



CATCH THAT RABBIT

The holiday was longer than two weeks, Mike Donovan admitted that. It was six months with pay. He admitted that, too. But he and Powell were out on the asteroid and there were problems. The new robot, with its six subsidiary robots, was designed as a team for mining on asteroids. The team worked well as long as Donovan watched it. But when Donovan didn't watch it, the robots didn't work. They didn't bring back any ore from the mines of the asteroid; they didn't even come back punctually: Donovan had to fetch them.

Donovan explained this to Powell, and they discussed the problem again and again.

'Well, let's talk to the robot,' Powell suggested finally. 'if we can't find out what's wrong, US Robots loses a hundred million in cash – and we lose our jobs.'

Donovan fetched robot DV-5 and kicked the door shut.

'Hi, Dave,' Powell said. 'How do you feel?'

'Fine,' said the robot. 'OK if I sit down?' he sat down on the specially strong chair which was kept for robots. DV-5 was not huge robot, but he was two metres tall, and weighed five hundred kilograms.

'Dave, you're a good robot, a sensible mining robot,' Powell began. 'You have been designed to collect ore from the rocks of asteroids. And you control six subsidiary robots.'



The robot nodded. 'That's great. So what's wrong, boss?'

'Something's wrong with your job. For example, this morning you didn't produce any ore.'

'I can't explain that, boss,' Dave said uncertainly, 'My subsidiaries worked smoothly. I did, too. I remember that.' His photoelectric eyes burned. 'Then I don't remember any more. The day ended, and there was Mike.'

Powell looked at Dave cautiously. 'How about a test, Dave? It would be the sensible thing to do.'

'If you say so, boss.'

The test started simply and became more difficult. Robot DV- 5 carried out mathematical problems, then mechanical problems and finally solved problems of judgment. The test lasted two hours.

'How does it look?' the robot asked.

'I've got to study it, Dave.' Powell pulled his moustache. 'Go back to work, but take it easy.'

The robot left and Donovan looked at Powell.

'His positronic brain is working perfectly,' Powell said.

'He goes wrong only when we're not near,' Donovan said urgently. 'I feel uneasy about that. There's something very, peculiar about it and I don't -'

Powell shook his head. 'No, no. just calm down. There must be a simple explanation for this. I'm going to watch him all the time. I'll fix up a camera, with a screen, here in his office. There's a problem, but we don't know what the problem is. We must discover the problem before we can solve it. You must catch the rabbit before you can cook rabbit stew! Well, we've got to catch the rabbit!'

*

Donovan stared at his report with tired eyes. 'Greg, we've underproduced by thousand tonnes.' He pushed his hands through his wild red hair. 'If it weren't for the money, I'd resign. I'm so tired of working with crazy new robots. *Greg!*'

Powell jumped at Donovan's wild shout and they both stared at the screen on the wall.

'They've gone completely crazy!' Donovan whispered.

'Get your suit on. We're going out there Powell said.

The robots were marching, their metal bodies shining against the dark rocks of the airless asteroid. Dave marched in front, and the six subsidiaries followed him, each robot close to the one in front. They stopped, turned and marched again, each one keeping in a perfect step.

'They're absolutely mad,' Donovan said. 'They're marching like soldiers. Perhaps they're practicing for a war.'



'We don't know what they're are doing,' Powell said coldly. 'Think first, and don't speak afterwards, either.'

Donovan frowned and slid a gun into the belt of his suit. Slowly, they walked through the darkness towards the robots. They tried to reach Dave by radio but the robot didn't answer.

'Let's get up on that rock so that we can watch them carefully. They're marching this way.'

Donovan jumped. Gravity on the asteroid was lower than it was on Earth, but with a heavy suit it was quiet a big jump. Powell followed. The robots marched towards them. But suddenly, when Dave was about sit metres away from the humans, he stopped. The subsidiary robots stopped, too, and then they moved away rapidly. Dave watched them for a minute and then slowly sat down on the ground.

'Are you here, boss?'

Powell and Donovan jumped off the rock. 'What's been happening, Dave?' Powell asked.

The robot shook his head. 'I don't know. One moment I was working on a difficult rock in Tunnel 17, and the next moment I was aware of humans near me.'

'Where are the subsidiaries now?'

'Back at Tunnel 17, of course. How much time has been lost?'

'Not much,' Powell replied. 'Mike, stay with him for the rest of the day.'

*

Three hours later Donovan returned. 'Nothing goes wrong when you watch tem,' he said tiredly.

Powell pushed his chair back and put his feet on the desk. 'Listen, Mike. I've got an idea,' he began. 'Dave never goes wrong when a human is near him. When he *is* wrong, the arrival of a human solves the problem.'

'I told you that I feel uneasy about that.'

'Be quiet. How is a robot different when humans are absent? The answer is obvious. The robot needs to use more personal initiative.'

Donovan sat up straight. 'There isn't just one part of the body which controls personal initiative. Look, I'm a specialist in robot circuits, as you know, and I can tell you all the circuits are involved. We need to find out what particular condition sends him wrong, and then start looking at the circuits.'



Powell said cautiously, 'Suppose we interview a subsidiary?'

Neither Powell nor Donovan had spoken to a subsidiary robot, because they were controlled almost wholly by Dave. They were almost as close to Dave as his fingers. In fact, Powell and Donovan often called them Dave's fingers'.

Donovan fetched one of the subsidiaries. Powell looked at DV- 5- 2. 'Several times recently, your boss stopped working unexpectedly. Do you remember?'

'Yes, sir.'

'What were you doing each time?'

The 'finger' answered the question automatically, without interest. 'The first time, we were working on a difficult rock in Tunnel 17. The second time, we were supporting a roof in a Tunnel 12. The third time, we were preparing to tunnel at a new level. And the fourth time was after a fall of rocks in Tunnel 17.'

'What happened at these times?'

'I can't really describe it. An order was given, but before we could receive it, we were ordered to march or dance.'

'Why?'

The subsidiary robot shook his head unhappily. 'I don't know?'

AUTORA: Marixa Maldonado Pérez

Powell sat back. 'All right. Get back to your boss.'

The 'finger' left and Powell turned to Donovan. 'We've got to catch the rabbit. We've got to get out there and watch them all the time. And wait for something to go wrong.'

'No,' Donovan said suddenly. 'We can make Dave go wrong, while we're watching.'

Powell was puzzled. 'How?'

'Think about it. You've got the brains, you think. When does DV- 5 go wrong? Think about what that "finger" of Dave's told us just now. He goes wrong when they're working on a difficult rock, or supporting a roof, or preparing a new tunnel, or after a fall of rocks.'

'Obviously, during emergencies.' Powell was eager now.

'Exactly! It's personal initiative that's the problem. And during emergencies, when a human being is absent, personal initiative is used more than during ordinary times. Now, we want to watch Dave in an emergency, so we must create our own!'

'You're right. Now what emergency can we create?'

'Rocks falling in a tunnel? Let's start.'

*



Powell and Donovan moved slowly across the rocky asteroid, kicking rocks to right and left and creating clouds of grey dust.

'We must be careful not to get too close to the robots, or they will become aware of us,' Powell said.

'I know that,' Donovan replied shortly. 'Down here.'

They were in the tunnels now. The starlight was gone, and only their torches lit the dark walls. Long minutes passed as they walked forwards. Powell held the detonator carefully. Suddenly, they felt a slight vibration in the rock walls.

'We're near!'

Then there was a movement ahead, the shine of metal across the end of the tunnel. They waited silently.

'Let's turn along this tunnel on the right,' Donovan whispered after a moment.

As they moved along the narrower tunnel on the right, the vibration became more noticeable.

'This tunnel's no good. It's blocked at the end,' Donovan said, holding his torch high.

'No. Wait a minute,' Powell said. 'I can see a light. I think there's a hole at the end. The robots must be on the other side.'

The tunnel was very narrow and steep. The two humans in their heavy suits climbed slowly to the end of the tunnel and looked through the hole. It was too small for a man to go through; they could only just look through it together. The robots were twenty metres down the main tunnel, working at the rocks.

'Hurry. They'll be moving on soon,' Donovan said. 'There's a weak place in the roof there, near the robots. If you aim at the place, half the roof will fall beside them.'

'Right. Now watch the robots.' Powell lifted the detonator and threw it down the tunnel towards the robots.

It flashed! There were several violent vibrations and Powell and Donovan fell heavily to the ground.

'Greg! I didn't see a thing!'

Powell stared around wildly. There was no sign of the robots. 'Where are they? Have we buried them?'

'Let's get down there,' Donovan said anxiously.

Powell began to slide backwards down their steep, narrow tunnel and Donovan followed.

'Mike!'

'What's happened now?'



‘Mike, we’re trapped! Our own roof fell! Here, in our tunnel!’

Donovan slid down beside Powell and shone his torch on the new, solid wall of rocks in front of them. For a few moments they tried to move the rocks, but without success.

‘What a disaster!’ Powell said.

‘How much oxygen have we got? Not more than six hours.’

‘We could get Dave to dig us out easily in that time, but no doubt our emergency has disturbed him.’

They climbed back up the tunnel and Donovan looked through the hole. ‘I can see them! They’re marching. No, wait a minute. They’re dancing! They are dancing towards us!’

‘I hope they come near enough. Dave can sense our presence at six metres. How near are they now?’

‘Fifteen metres. We’ll be out in fifteen minutes. Oh, no!’

‘What? Let me look!’ shouted Powell.

‘They’ve turned! They’re leaving!’

Powell and Donovan. ‘Mike! Listen, I’ve got an idea! Let me get in there before they move too far away!’

Donovan slid down. ‘Hey! What are you going to do with that gun?’ He held on to Powell’s arm.

Powell shook him off violently. ‘Let me get in there!’ He aimed his gun carefully through the hole at one of the robots, and then fired. He brought the gun down and stared anxiously along the tunnel. One of the subsidiaries was down!

Powell called uneasily into his radio. ‘Dave?’

There was a pause, and then both men heard the answer. ‘Boss? Where are you? My third has been destroyed.’

‘Leave your subsidiary. We’re trapped down here. Can you see the light from our torches?’

‘Yes. We’ll be with you in a few minutes.’

Powell dropped on to the floor. ‘It’s all over!’ he said thankfully.

‘All right, Greg,’ Donovan said softly. ‘You win, and I’m just stupid. Now tell me all about it.’

‘Easy. We missed the obvious fact. We knew it was a problem with personal initiative. What type of order needs most initiative? What type of order is given almost always only in an emergency?’

‘Don’t ask me, Greg. Tell me!’



‘It’s the order to all six “fingers”. In a normal situation, several of the subsidiaries would be doing routine jobs, and orders would be given separately. But in an emergency, all six subsidiaries must be given orders at exactly the same time. Dave can’t communicate with all six at the same time, so his circuits get overloaded and he starts to act crazy. When I destroyed one of the robots, Dave was able to communicate with five “fingers”. The initiative needed wasn’t so great and he became normal. It was a guess, I tried it, and it worked.’

The robot’s voice was in their ears again. ‘Here I am. Will you be all right for half an hour, till we get you out?’

‘Easy!’ said Powell. Then to Donovan he continued, ‘And now this job should be simple. We check all the circuits, and see which ones can communicate only five orders, and change them.’

‘I think that there’s only one particular controlling circuit, which would be the problem. That’s an easy job.’ Donovan sounded cheerful. ‘I wonder why Dave began marching and dancing whenever he went crazy.’

Powell shook his head. ‘I don’t know. But I’ve got an idea. Those subsidiaries were Dave’s “fingers”. Perhaps when there was an emergency and he went to crazy, he just passed the time by playing with his fingers.’

*

Susan Calvin talked about Powell and Donovan with unsmiling amusement, but her voice grew warm when she spoke of robots. She had told me about the Speedies, the Cuties, and the Daves, and then I stopped her before she began to tell me about another type.

‘Doesn’t anything ever happen on Earth?’ I asked.

She looked at me with a little frown. ‘No, we don’t have many problems with robots here on Earth.’

‘That’s too bad. Our readers will enjoy the stories about our engineers, but can’t we have a story about you? Didn’t a robot that you were working on ever go wrong?’

Dr. Calvin’s face reddened. ‘Well, yes. Robots have gone wrong. It’s a long time since I thought about it. It was almost forty years ago- 2021. And I was only thirty- eight. Oh dear- I’d rather not talk about it.’

I waited, and she changed her mind.

‘Why not?’ she said. ‘It can’t hurt me now. Even the memory can’t. I was foolish once, young man. Would you believe that?’

‘No,’ I said.

‘I was. But Herbie was able to read minds. The only robot of its kind, before since. A mistake – somewhere...’



UNIVERSIDAD DE CUENCA

LIAR!

Alfred Lanning lit his cigar carefully, but his fingers were trembling a little. He frowned as he was speaking. 'It can actually read minds. Little doubt about that! But why?' he looked at mathematician Peter Bogert. 'Well?'

Bogert passed both hands over his smooth black hair. 'That was the thirty-fourth RB robot we've produced. All the others were absolutely normal.'

The third man at the table frowned. Milton Ashe was the youngest director of US Robots Company, and proud of his position. 'Listen, Bogert. In the factory, we make sure that each robot is produced perfectly.'

Bogert smiled unpleasantly. 'Do you? A positronic brain is very complicated. It involves 75,234 separate operations in the factory in order to produce one positronic brain. You yourself have told us this. If any one of those operations goes seriously wrong, then the brain is useless.'

Milton Ashe reddened, but a fourth voice prevented his reply. 'If we're going to start blaming each other, then I'm leaving.' Susan Calvin's thin lips did not smile. 'We've got a mind-reading robot and it's important that we discover the reason.' 'Your fault! My fault!' - that isn't going to help.' Her cold grey eyes fixed on Ashe and he smiled.

Dr Lanning smiled, too. 'True, Dr Calvin,' he said. 'We've produced a positronic brain that can read minds. We don't



know how it happened. Ashe, I want you to check the factory, from the beginning to the end. Everything. And list any operations where they may have been a mistake.' Lanning turned to Calvin. 'You must study the robot itself. As a psychologist of the company, you must find out how it works and whether it is normal in other ways. I'll work on the problem mathematically- with Bogert, of course.'

Ashe pushed his chair back. 'Since I've got the most difficult job, I'd better begin.'

Susan Calvin's eyes followed him as he left the room.

*

RB-34's photoelectric eyes lifted from the book when the door opened and Susan Calvin entered.

'I've brought you some more books on atomic engines, Herbie,' she said.

Herbie lifted the three heavy books from her arms. 'Sit down, Dr Calvin. This will take me a few minutes.'

The psychologist sat down and watched Herbie as he went through the books carefully. At the end of half an hour he had finished.

'These books don't interest me,' he said. 'Your science is just an enormous collection of facts, loosely connected by rather unclear ideas. It's so simple that I don't want to bother

with it. I want to read your novels, your stories, to find out how your minds work, and to learn about human feeling.'

Dr Calvin whispered, 'I think I understand.'

'I see into human minds, you see,' the robot continued. 'You have no idea how complicated they are. I can't understand everything, because my own mind is so different. But your novels help me to understand.'

'If you enjoy the painful feelings described in popular novels, you must find real minds like ours dull and colourless,' said Dr Calvin.

'But I don't!' Herbie's reply sounded sympathetic.

Dr Calvin reddened, and thought wildly, 'He knows!'

'Of course I know about it,' Herbie said in a low voice. 'You think of it all the time, so of course I know.'

Her face was hard. 'Have you — told anyone?'

'Of course not!' Herbie was surprised. 'No one has asked me.'

'I'm ugly, and I'm much older than he is,' she said bitterly. 'He doesn't see me as a woman.'

'You're wrong!' Herbie's metal hand banged the table. 'Listen to me —'



'Why should I? You're a machine. You're not interested in me as a person. To you, I'm just an example of a peculiar human mind — like your novels.' Her voice was full of pain.

Herbie shook his head anxiously. 'Listen to me. I could help you. I know what Milton Ashe thinks.'

Susan Calvin was silent for a long time. Then her eyes dropped. 'Keep quiet,' she gasped.

'You'd like to know his thoughts,' the robot said quietly. 'He loves you.'

Dr Calvin stared. 'You're mistaken! Why should he?'

'He looks deeper than the skin,' the robot explained. 'And he needs a clever woman.'

Susan Calvin's voice trembled. 'He has never shown any interest. And a young girl visited him at the factory six months ago. Young and pretty. Who was she?'

Herbie answered at once. 'I know the girl. She's his cousin. There is no love between them.'

Susan Calvin stood up and held Herbie's cold, heavy hand in both hers. 'Thank you, Herbie,' she whispered urgently. 'Don't tell anyone about this. Let it be our secret. And thank you again.'

She left the room and Herbie turned slowly to another novel. There was no one to read his thoughts.

AUTORA: Marixa Maldonado Pérez

*

Milton Ashe was tired. 'I've been working for a week, without much sleep. How long must we go on like this?'

Bogert looked at his smooth, white hands. 'I'm nearly there. It's Lanning who's causing the delay. He's too old and won't use the new, more powerful, mathematical tools.'

'Why not ask Herbie? He knows everything about mathematics, although he doesn't like it. Didn't Calvin tell you?'

'No. She hasn't told us about this. Why has she told you?' Bogert asked crossly.

'Well, I've been talking to the old girl a lot.' Ashe frowned. 'Have you noticed that she's been peculiar recently?'

Bogert laughed unkindly. 'She's using perfume, if that's what you mean.'

'Yes. But there's something else. She's happy - as if she's got a secret.'

Bogert laughed again. 'Maybe she's in love.'

Ashe closed his eyes. 'You're crazy, Bogert. You go and talk to Herbie. I want to stay here and sleep.'

*



Herbie listened carefully to Peter Bogert's explanation of the problem and studied the figures on the sheet of paper. 'I see no mistake,' he said.

'Can you help me further?'

'You're a better mathematician than I am.'

Bogert smiled proudly. 'I thought so. Well, forget it.' He turned to leave, and then stopped. 'Actually, there is something else . . .' Bogert found it difficult to continue.

Herbie spoke quietly. 'Your thoughts are confused, but they are all about Dr Lanning.'

Bogert put up his hands and passed them over his smooth hair. 'Lanning is nearly seventy. He's been Managing Director of the company for thirty years.'

Herbie nodded.

'Well now, do you know whether he's going to resign?' 'Certainly. He has already resigned.'

'What? Say that again!'

'He has already resigned. He's waiting to solve the problem of... er ... myself. Then he'll be ready to leave the Managing Director's office to the next director.'

Bogert was breathing heavily. 'And the next Managing Director? Who is he?'

Herbie's words came slowly. 'You are the next Managing Director.'

Bogert smiled. 'I've been hoping and waiting for this. Thanks, Herbie.'

Bogert was at his desk until five that morning and he was back at nine. Pages of figures covered his desk and the floor. At twelve o'clock he rubbed his eyes. 'This is getting worse each minute.'

At that moment, the door opened and Lanning entered. 'Has Calvin told you about the robot? Fantastic mathematical brain.'

Bogert laughed. 'I've checked Herbie, and he's no good.'

'You're wrong. I've been with Herbie all morning and he's extraordinary. Look at this.'

Bogert studied the figures on the sheet of paper.

'You see,' said Lanning. 'He agrees with me.'

'Well then, let him solve the whole problem for you,' Bogert said angrily.

'No, he can't solve it. So I'm taking it to the National Mathematical College. May be they can solve it for us.'

Bogert jumped up, his face red. 'You can't do that!'



Lanning stared at him in surprise. 'Are you telling me what I can't do?'

'Exactly. You're too old d for this game and you're just trying to prevent my success. I can solve that problem and you're not going to take it away. Understand?'

Lanning frowned. 'You're crazy! You can't speak to me like that! You're finished in this company!'

'Oh no, I'm not, you old fool. You haven't got any secrets with that robot around. I know that you're going to resign. And I know that I'm the new director. I'm going to be giving the orders here soon.'

'You're finished! You're out!' Lanning shouted.

Bogert smiled widely. 'I know that you've resigned. Herbie told me. And he got it out of your mind.'

Lanning forced himself to speak quietly. 'I don't know what's happening, Bogert, but let's go and speak to Herbie.'

*

It was also at exactly twelve o'clock that Milton Ashe looked up from his clumsy drawing and said, 'You see? I'm not very good at drawing, but it's a lovely house, and not expensive either.'

Susan Calvin's expression was soft. 'It's really beautiful. I've often thought ...' She stopped.

AUTORA: Marixa Maldonado Pérez

'Of course,' Ashe continued, 'I've got to wait for my holiday. The Herbie problem is delaying that. And there's a secret, too. I must tell someone.'

Susan Calvin's heart began to beat faster, but she could not speak.

'Actually, the house isn't for myself alone,' Ashe whispered. 'You remember the girl who visited the factory last summer? I'm going to marry her!' And then he jumped up from his chair. 'What's the matter? Are you ill?'

'No, no!' Susan Calvin said weakly. 'It's just a headache. I must — congratulate you.' Her face was white and her words came with difficulty. 'Excuse me ... please. ...'

She walked blindly out of the room. It was like a dream, a horrible, unreal dream. Herbie could read minds! He had said ... ! She ran upstairs and into Herbie's room. She stared at the robot and his red eyes stared at her.

'It's a dream!' Herbie said. His voice sounded frightened and anxious. 'He loves you! He does! You'll wake up soon.'

Susan Calvin wanted to believe Herbie, but the fog was clearing from her mind. 'What are you trying to do?' she screamed.

Herbie moved back. 'I want to help.'



'Help?' The psychologist stared. 'You tell me that the truth is a dream, and you want that to help me?' She breathed deeply. 'Wait - I understand it now. It's so obvious!'

There were loud voices outside the door and Calvin turned and moved to the other end of the room. When Bogert and Lanning entered, neither of the men noticed her.

'Now, Herbie,' Lanning began angrily, 'have you discussed me with Dr Bogert?'

Herbie answered slowly, 'No, sir.'

Bogert moved in front of the robot. 'Repeat what you told me yesterday!'

'I said that ...' Herbie was silent.

'You said that he had resigned, didn't you?' Bogert shouted. 'Answer me!'

Lanning pushed Bogert away. 'Take it easy, Herbie. Have I resigned?'

Herbie stared but said nothing.

'What's happening? Can't you speak?' asked Bogert impatiently.

'I can speak,' Herbie said quickly.

'Then answer me. Hasn't Lanning resigned?'

Again Herbie was silent, until Susan Calvin laughed, loud and long.

The two mathematicians jumped. 'So you're here? What's so funny?'

'Nothing's funny.' Her voice was not quite natural. 'The three of us have fallen into the same trap, that's all.' Her voice trembled, and she put a hand to her forehead. 'But it isn't funny.'

The two men looked at each other. 'What trap are you talking about?' Lanning asked stiffly. 'Is something wrong with Herbie?'

'No.' She moved slowly towards the two men. 'Nothing is wrong with him — only with us. Get away from me!' she shouted at Herbie. 'Go to the other end of the room and don't let me look at you.'

Herbie was silent, and he quickly moved away.

Lanning was angry. 'What's the matter, Dr Calvin?'

She turned to him. 'You know the First Law of Robotics. A robot must not injure a human being, or allow a human being to come to harm.'

The two men nodded.



'Now, what type of harm? Any type of harm! What about hurt feelings? What about the destruction of our hopes, our dreams? Aren't those injuries too?'

Lanning frowned. 'Robots don't understand our hopes and feelings ...' He stopped suddenly.

'Herbie *does* understand! He reads our minds and gives us the answers we want to hear. He can't tell us the truth if he knows the truth would hurt us. If he did that he would be breaking the First Law. A robot can't do that.'

'That's why it didn't answer us. It couldn't answer without hurting us!' Lanning said.

There was a short pause. The two men looked across the room at the robot, sitting by the window.

'He knows everything,' Calvin went on. 'Including the mistake which was made in the factory when he was being produced.'

Lanning looked back at Susan Calvin. 'You're wrong. I asked him and he doesn't know.'

'He knows,' Calvin repeated. 'You didn't want to know the truth! You would hate it if a machine could do what you couldn't. And what about you?' She challenged Bogert.

'I asked him,' Bogert said cautiously, his face reddening. 'He told me that he knew very little about mathematics.'

AUTORA: Marixa Maldonado Pérez

Lanning laughed and even Calvin smiled.

'Herbie! Come here!' she called coldly. 'You know exactly what went wrong in the factory, don't you?'

Herbie came towards them. 'Yes,' he said very quietly indeed.

'Tell us.'

But Herbie remained silent.

'Why don't you answer, Herbie?'

'I can't!' the robot said. 'Dr Lanning and Dr Bogert want to discover the mistake themselves. They don't want me to tell them.'

Lanning spoke slowly. 'Tell us, Herbie. We want you to tell us.'

Herbie's voice became wild. 'You don't! I can see deep into your minds! You don't want a robot to tell you the truth!'

'But you understand that Dr Lanning and Dr Bogert want to know about the mistake?' Calvin asked quietly.

'Yes! Yes! But not from me!'

'But they want the answer. You have it and won't give it to them. So that hurts them too, doesn't it?'

'Yes! Yes!'



'You can't tell them, because that would hurt them. But if you don't tell them, you are also hurting them. So you must tell them. But if you tell them, that would hurt them. So you can't tell them.'

Herbie moved backwards. 'Stop!' he shouted. 'Your mind is full of anger and pain! You hate me! But I was trying to help you!'

The psychologist did not listen. 'You must tell them. But if you do, you will hurt them. So you mustn't tell them. But if you don't tell them, you are hurting them. So you must tell them.'

And Herbie screamed!

He screamed louder and louder, like the whistle of a thousand escaping steam jets, until the room was filled with noise. And when the noise died, Herbie fell to the ground, an untidy heap of metal.

Bogert's face was bloodless. 'He's dead!'

'No!' Susan Calvin laughed wildly. 'Not dead. Just mad. I forced him to face the impossible conflict he was in, and he broke down. You can throw him away now. He'll never speak again.'

Lanning trembled. 'You did that deliberately!'

'Why not? I'm glad,' Susan Calvin said bitterly.

AUTORA: Marixa Maldonado Pérez

The Managing Director took Bogert's arm. 'Come, Peter,' he said. 'We don't want a robot like that, anyway.' His eyes were old and tired, and he repeated, 'Come, Peter.'

The two men left the room, but Susan Calvin still stared at Herbie. Slowly, the anger left her face, and out of all her stormy thoughts came only one bitter word: 'Liar!'

*

Susan Calvin sat there behind her desk, her white face cold.

I said, 'Thank you, Dr Calvin!' But she didn't answer. It was two days before she agreed to see me again.

LITTLE LOST ROBOT

When I did see Susan Calvin again, it was at the door of her office. Her papers were being moved out.

She said, 'How is your work going, young man?'

'Fine,' I said. 'Would you look over it? I don't want to be inaccurate.'

She seemed cheerful. 'I suppose so. Shall we go to the directors' dining room for coffee?'



When we were sitting down, I asked Dr Calvin about the robots working on the development of atomic engines for space travel on the asteroids. 'Space stations are now out of date, and robot mining is quite common. I'd like to write something about the robots' invention of the new atomic engine.'

She was thoughtful. 'My first experience with space travel and atomic engine development was in 2029, when a robot was lost ...'

*

Susan Calvin had never left Earth before. There was an emergency with the robots on the main station of the twenty-seventh group of asteroids and a special government ship brought Dr Calvin and Dr Bogert to solve the problem. Dr Calvin didn't want to leave Earth and she was unsure that it was a real emergency. During their first dinner at the station, her plain face wore an unhappy expression.

General Kallner was in charge of the robots at the main station, and he began to explain the problem to the visitors.

'We've lost a robot. Work has stopped and can't begin again until the robot is found. I needn't tell you how important our work is, at this station. We're using more than eighty per cent of the money available for scientific development.'

'We know that,' Bogert said pleasantly. 'You're paying for a lot of robots from US Robots.'

Susan Calvin was not so pleasant. 'Why is one robot so important? And why hasn't it been found?'

General Kallner's face was anxious. 'Well, we have found it, in a way. As soon as the robot failed to report, we declared an emergency and all work was stopped. But the day before, sixty-two new robots of the same type had arrived from Earth. We were going to keep two, and sixty were going to another station. But when we counted the robots, after our robot was lost, there were sixty-three robots.'

'So the extra robot is yours?'

'Yes. But we don't know which one is ours.'

Susan Calvin was silent for a few moments. 'Very peculiar.' She turned to her colleague with some anger. 'Peter, what's wrong here? What kind of robots are they using?'

Dr Bogert hesitated and smiled weakly. 'It's been a sensitive matter, Susan.'

'If there are sixty-three robots of the same type, why can't any one of them be used? What's the problem? Why are we needed?'

'Let me explain,' Bogert said slowly. 'This development station is using several robots whose brains were not provided with the whole First Law of Robotics. It was a secret - only a very few people at US Robots knew about it.'



General Kallner spoke quickly. I didn't realize that you were unaware of this situation, Dr Calvin. I needn't tell you that on Earth many people strongly oppose robots. The government, of course, argues that robots always have an unbreakable First Law. But we desperately needed robots of a different nature. So just a few NS-2s were made for us without the whole of the First Law. To keep the secret, *all* NS-2s are made without serial numbers, and those without the whole of the First Law are delivered with a group of normal robots.'

Calvin's expression was fierce. 'Have you asked each robot who it is?'

The general nodded. 'All sixty-three robots say that they have never worked here - and one is lying. Dr Calvin, we cannot let the delivery ship leave this station. If people on Earth learn about these new robots, you can imagine the trouble. ...'

'Destroy all sixty-three,' said the psychologist coldly.

Bogert frowned. 'Destroy millions of dollars? US Robots wouldn't like that. We must try to find the robot, Susan, before we destroy anything.'

'Well then, I need facts,' she said sharply. 'General, why did this station need these particular robots?'

'We had trouble with our previous robots. Our men work with some radiation, you see. It's dangerous, of course, but

we're very careful. We explained to our robots that the work is necessary, but every time a human being went near the radiation, a robot would pull him away. You know the First Law of Robotics: a robot must not injure a human being, or allow a human being to come to harm. We ordered the robots to allow our men near the radiation, but the Law of obedience is only the Second Law. Radiation can destroy the positronic brain, but the First Law is stronger than the Third Law which says that a robot must protect itself.'

'What kind of First Law do the secret robots have?'

'Their brains contain part of the first Law: a robot must not harm a human being. That is all.'

'And that is the only difference? Peter?'

'The only difference, Susan.'

She stood up. 'I'm going to sleep now. And in eight hours, I want to speak to the person who saw the robot last. And from now on, General Kallner, I am responsible for this situation and I want control.'

*

Gerald Black sat in front of Calvin and Bogert. He was young and aggressive, his white shirt was dirty, and his fingers pulled each other nervously.



Calvin watched him with interest. 'You worked with Nestor 10 before he disappeared. Have you worked with robots before?'

'I've worked with other robots on the station. The Nestors are like other robots but they're cleverer - and more annoying. They're curious, they're calm, they don't worry. They never hurry. They tell you when they think that you're doing something wrong.'

Bogert asked softly, 'Anything particular happen that morning?'

Black didn't answer for a moment. i had a little trouble with him. I was late with my work, and he carne and asked me to repeat some tests we had done a month ago. He was always annoying me about that and I was impatient. I used some strong language and - and told him to get lost.'

'You told him to get lost?'

The young man's face reddened. i was just annoyed with him. I didn't really want him to lose himself.'

'I realize that,' Dr Calvin said. 'You may leave, Mr Black. Thank you for your assistance.'

*

Next, Susan Calvin interviewed the sixty-three robots. It was five hours of questions A, B, C, D and answers A, B, C, D. The psychologist was exhausted.

'All sixty-three seemed the same to me,' she told Bogert. 'But one of the sixty-three has deliberately lied to me. That's serious.'

'Nestor 10 was ordered to lose himself. And he has lost himself among a group of similar robots. That's clever,' Bogert said with a smile.

'This is a serious matter,' Calvin said sharply. 'We can't allow a robot to lie to us. We have to develop some more tests.'

*

In the huge Radiation Room of Building Two, a man sat in a chair, stiff and silent. In a circle around the edge, were sixty-three small wooden rooms, in which sat the sixty-three robots. The wooden rooms were open to the front, but hidden from each other. Above the man in the chair, a heavy rock dropped downwards, then was pushed away at the last moment by a powerful force beam. Sixty-three robots rushed forwards in that milli-second before the rock moved away.

The rock rose and dropped, rose and dropped, rose and dropped. Ten times.



Ten times the watching robots rushed forwards, and stopped as the man remained safe.

General Kallner looked anxiously at Dr Bogert. 'What are you looking for?' he asked.

Bogert shook his head. 'We're not finding it,' he said. 'Sixty-two robots had to rush forwards to save the human. After the third or fourth time, they must have realized that the rock wasn't going to harm the man. But they were forced to rush forwards by the First Law.'

'Well?'

'The missing robot was free to stay in his seat. His changed First Law would not force him to rush forwards. But obviously he wished to copy the behaviour of the other robots,' Bogert explained.

Calvin entered the room. 'Nestor 10 is aware of what we are doing,' she said. 'He's deliberately hiding from us. I don't like what's happening. Nestor 10 is no longer just obeying the order to get lost. I'm afraid that now he wants to be cleverer than we are.'

'What can we do now, then?'

'We shall repeat the test. But this time we shall place an electric cable between the robots and the man in danger. We shall inform the robots that they will be destroyed if they

touch the cable. But we shall arrange secretly that the electricity is cut off immediately if a robot touches the cable.'

'Will that work?' the general asked, his eyes full of hope.

'It should. Sixty-two robots will rush forwards to die, because of the First Law. But our Nestor 10, without the whole First Law, and without any orders under the Second Law, must follow the Third Law.'

*

A man sat in the chair, stiff and silent. A heavy rock dropped downwards, then moved away at the last moment.

Only once.

And from her position on the platform above the robots, Dr Calvin jumped up in horror.

Sixty-three robots sat quietly in their chairs, staring at the man in front of them. Not one moved.

*

Dr Calvin was angry. Angrier than she had ever been before. But she could not show her anger to the robots who were entering her room and then leaving.

Number 28 entered.



'I want to ask you some questions,' she began quietly. 'You were in the Radiation Room of Building Two, about four hours ago?'

'Yes.'

'There was a human who was almost harmed, wasn't there?'

'Yes.'

'Why didn't you save him?'

The robot was disturbed. 'You told us that the electric cable would kill us. If I moved to save him, then I would be killed first, and he would die anyway. And since it was impossible to save him, I could not destroy myself — without orders.'

The psychologist had heard the same story twenty-seven times. The most important question came next. 'An interesting idea,' she said. 'But did you think of this idea yourself?'

The robot hesitated. 'No. We were talking last night and someone had that idea and it sounded reasonable.'

'Which robot?'

The robot thought deeply. 'I don't know. Just one of us.' Susan Calvin nodded. 'That's all,' she said.

Number twenty-nine was next.

*

General Kallner, too, was angry. For a whole week, all work on the main station of the twenty-seventh group of asteroids had stopped. For nearly a week, Calvin and Bogert had tested the robots without result. And now Dr Calvin had another idea.

'We must separate the robots if we want results,' she demanded.

'My dear Dr Calvin.' Kallner controlled his anger. 'I can't separate sixty-three robots all over the station!'

'I can do nothing more, then. This little lost robot is either imitating what the other robots do, or teaching them to do what he does. He's winning all the time. And the more he wins, the more dangerous he gets. There's a strong chance that the remaining part of the First Law will break down, too.'

Suddenly, Gerald Black appeared at the door. 'I've just noticed something,' he said. 'The locks of the robots' rooms have been damaged. I think Nestor 10 is trying to escape.'

The others stared at him.

At last, Susan Calvin spoke quietly. 'That robot is capable of taking control of the ship and leaving the station with the



sixty-two other robots. Then we'd have a mad and dangerous robot on a spaceship. What would he do next? Any idea?'

'What else can be done?' Kallner begged.

'I can't think of anything.' Calvin sounded tired. 'if only there were other differences between Nestor 10 and the normal NS-2 robots ...' And she stopped suddenly.

'What is it?'

'I've thought of something.' She turned to Gerald Black. 'The NS-2s have learned about radiation while working with you scientists here on the station?'

Black nodded. 'Yes. They know nothing about it when they arrive.'

'I understand. Please leave me. Let me have an hour or two.'

*

Bogert was talking to the robots now, because Calvin was so exhausted. Number 14 came in.

'When you leave this room you will be taken to a place where you will wait until you are needed. Another person will be in danger. You will try to save that person.'

'Yes, sir.'

'Unfortunately, between the human and yourself there will be an area of radiation. Have you ever worked with radiation?'

'No, sir.'

'Well, radiation will kill you at once. It will destroy your brain. You must remember that. Naturally, you don't want to destroy yourself.'

The robot seemed shocked. 'Naturally. But how can I save the human? I would destroy myself first.'

'Yes,' Bogert said slowly. 'That's true. Well, I advise you to sit where you are if you notice radiation between you and the human being.'

'Thank you, sir,' the robot said more happily.

'Of course, if there weren't any dangerous radiation, then you would save the human.'

'Naturally, sir.'

*

The large Radiation Room was ready. The sixty-three robots waited patiently in their tiny wooden rooms, all open to the front, but hidden from each other.

'You're sure that none of the robots have spoken to each other since their interview?' Dr Calvin asked.



'Quite sure,' Black said firmly.

'I'm going to be sitting in the chair in the centre,' Calvin told Kallner. 'I must see the tiniest movement.'

'Right.'

'Then let's try it one last time.'

She sat in the chair, silent, eyes restless. A heavy rock dropped downwards...

And a single robot stood up and took two steps forwards. And stopped.

Dr Calvin was up, too, her finger pointed at him. 'Nestor 10, come here,' she cried sharply. 'COME HERE!'

Slowly, unwillingly, the robot moved forwards. 'Get every other robot out of the room, Black,' the psychologist shouted, without taking her eyes from the robot. 'Get them out quickly, and keep them out.'

Nestor 10 came nearer. 'I was told to get lost — I must obey. I've been found — you're so weak and slow — I'm powerful and intelligent — they must not catch me — no-one must find me - no-one ...'

Another step and a metal arm pushed Dr Calvin's shoulder. The arm was so heavy that Dr Calvin fell to the ground, with the arm across her body. It did not move.

And now faces were bending over her.

'Are you hurt?' Black asked anxiously.

She shook her head as they moved Nestor 10 and lifted her up. 'What happened?'

'I flooded the area with radiation,' Black explained. 'When we realized that he was attacking you, there was no time to do anything else. Just enough radiation to destroy Nestor 10, but not enough to harm you.'

'I don't think he was attacking, exactly,' said Dr Calvin weakly. 'He was trying to, but his changed First Law was still holding him back.'

*

Later, Calvin explained to Bogert and Kallner how she had tricked Nestor 10.

'We warned all the robots that there would be radiation between themselves and the human being. So they didn't move.'

'Yes, yes, I understand that. But why did Nestor 10 move?'

'That was an arrangement between Mr. Black and myself. It wasn't dangerous radiation that flooded the area, but harmless light. Ordinary heat. Harmless. Nestor 10 knew that it was harmless and so he began to rush forwards. Then he realized that the normal NS-2s could sense radiation but



couldn't recognize the different types of radiation. Nestor 10 could, because he had worked with Mr Black here and had learnt about the different types of radiation from him. To the normal robot, the area was fatal, because we told them that radiation was fatal. But Nestor 10 knew that we had lied. And for a moment he forgot that the other robots knew less than he did.'

EVIDENCE

We finished our coffee and Dr Calvin began to talk about the developments of the last fifty years.

'Earth became too small for nations, and the change from nations to Regions was begun by robots. I'm thinking of a man who died last year.' Her voice was suddenly deeply sad. 'He arranged to die, because he knew that we needed him no longer. Stephen Byerley.'

'Yes, I guessed that you were talking about him.'

'He first entered government in 2032. You were only a boy then, so you won't remember his strange election as City Governor ...'

*

Francis Quinn was a politician, and he came to see Alfred Lanning with a problem.

Quinn's voice was friendly. 'I think you know Stephen Byerley?'

Dr Lanning, sitting at the other side of the desk, frowned impatiently. 'I have heard of him. I believe he may be our next City Governor.'

'That's right. At the moment he's only a lawyer. But if enough people vote for him at the election, three months from now, he will become the next governor.'

Lanning was becoming impatient. 'Mr Quinn, I have no interest in politicians —'

'But this matter is important for US Robots. You will understand if I tell you one thing: Mr Byerley never eats!'



Lanning's eyes were sharp. i find that quite extraordinary!' Francis Quinn's expression was amused. i have investigated Stephen Byerley carefully during the past year. His life has been quite ordinary: brought up in a small town, educated at university, a car accident, arrival in the city. And in this city, no one has ever seen him eat or drink. Never! And no one has seen him sleep.'

Lanning shook his head. 'You're trying to tell me one thing, and that one thing is impossible.'

'He's a robot, Dr Lanning.'

Lanning's old eyes were surprisingly sharp. 'That's impossible. You know that US Robots is the only company in the solar system which makes positronic brains, and the company has never made a robot with a human appearance and a human character.'

'However, your company will have to investigate this,' Quinn went on smoothly. 'You know very well that there are strict laws against the use of positronic robots on the planets. If Byerley is a robot, think of the trouble it will cause your company. Think of the public shock and horror ...'

Lanning stared at him in cold anger, and waited for him to go on.

'What happens to the positronic brains of your robots when their working lives end?' Quinn asked with a pleasant smile.

'The positronic brains are either destroyed, or used for new robots,' Lanning explained, impatiently.

'But it would be possible for someone to get hold of one of

those brains - unlawfully of course - and create a humanoid robot?'

'Scientifically, it would be possible to produce a humanoid robot, yes. But, Mr Quinn, it has not been done, I promise you!'

*

Stephen Byerley was forty years old, and he looked forty years old. He looked healthy and pleasant, particularly when he laughed. And he was laughing now.

'Really, Dr Lanning - a robot? I — I — a robot?'

Lanning frowned and looked at Dr Calvin who was sitting next to him. She was silent.

'Someone has told us that you are a robot, and we must investigate because our company is the only producer of positronic brains,' Lanning explained coldly.

'Oh yes, your position is clear to me. I'm sorry if my laughter upset you. How can I help you?'

'Will you sit down in a restaurant, with witnesses present, and eat?' Lanning asked quietly.

Dr Calvin watched Byerley carefully, and he looked at her for a moment before turning back to Lanning. i don't think that I can do that. I know Francis Quinn, you see. He doesn't want me to become City Governor and so he's invented this story. It's nonsense. I don't sleep much and I don't eat in public. Is that what Quinn's reports say?' He turned to Dr Calvin. 'You're the company's psychologist?'

'Robot psychologist, please.'

'Right. Well, as a psycho - robot psychologist, I guess that you've brought some food with you this morning.'



An expression of surprise crossed Susan Calvin's face. She opened her bag and produced an apple which she handed silently to Byerley across his desk.

Calmly, Stephen Byerley bit into the apple and calmly, he swallowed it.

Dr Lanning smiled widely. But only for a second.

'I was curious to see if you would eat it,' Susan Calvin said. 'But of course, it proves nothing.'

'It doesn't?' Lanning asked.

'Of course not. It's obvious that if this man is a humanoid robot, he will be a perfect copy. Look at his skin, his eyes, the bones in his hand. If he's a robot, then I wish that US Robots had made him, because he's a good job. Whoever made him so perfectly would make sure that he could eat and sleep if necessary.'

'Now wait,' Lanning said angrily. 'I'm not interested in whether Mr Byerley is human or not. I'm only interested in protecting US Robots. A public meal will end the matter.'

'But you forget that I want to become governor,' Byerley said. 'If Quinn wants to call me a robot, then I will play the game with him.'

Lanning looked unhappy. 'He's going to say publicly that you are a robot.'

'Exactly. Let him tell everyone. I shall defeat him in the end, by using his own weapon against him.'

Susan Calvin rose to her feet. 'Come, Dr Lanning. He won't change his mind.'

'You see.' Byerley smiled gently. 'You're a human psychologist, too.'

*

Perhaps Byerley was not quite so confident that evening when he arrived home. The man in the wheelchair looked up and smiled.

'You're late, Steve,' he whispered. He opened his mouth with difficulty.

'I know, John,' Byerley said gently. 'A peculiar problem delayed me.'

John's face had obviously been terribly burned years ago, but his eyes were clear. They were anxious now. 'Nothing you can't solve?'

'I'm not exactly sure. I may need your help: you're the clever one in the family. Let's go out into the garden. It's a beautiful evening.'

Two strong arms lifted John from the wheelchair and gently Byerley carried him through the house into the garden. Carefully, he put John down on the grass.

'Tell me about your problem.'

'Quinn is going to fight me as governor. He's going to say publicly that I'm a robot.'

John's eyes opened wide. 'It's impossible. I don't believe it.'

'It's true. Two scientists from US Robots came to my office today to argue with me.'

John's thin hands pulled at the grass. 'I see.'

'But I've an idea. Listen to me and tell me if we can do it.'

*

Francis Quinn stared at Alfred Lanning. Lanning stared fiercely at Susan Calvin, who stared quietly at Quinn.



'We've done what you asked,' Lanning said for the second time. 'We've witnessed the man eat. He's not a robot.'

At last, Quinn turned to Calvin. 'You've said nothing. Tell me what you think.'

'Now, Susan —' Lanning warned.

'Let her talk,' Quinn said smoothly.

Susan Calvin fixed cold eyes on Quinn. 'There are only two ways to prove Byerley is a robot. You can X-ray him. Or you can study his psychology. If he has a positronic brain, then he must obey the Three Laws of Robotics. Do you know them?'

Quinn nodded.

'If Byerley breaks any of those laws, then he isn't a robot. If he follows all the laws, he may be a robot. Or he may simply be a very good man.'

'So you're telling me that you can never prove him a robot?'

'I may be able to prove that he isn't a robot.'

The politician stood up. 'Then we shall see what Mr Byerley body looks likes under his skin. Somehow, I'm going to get evidence that he's a robot.' And he left the room.

Lanning turned impatiently to Calvin. 'Why do you insist on -'

'I won't lie for you,' she replied sharply.

'And what happens to US Robots if he opens up Byerley and a lot of wheels and electrical bits and pieces fall out? What then?'

'He won't open up Byerley,' said Calvin confidently. 'Byerley is at least as clever as Quinn.'

*

The newspapers were full of reports about the robot Byerley. Nobody could talk about anything else. At first there was loud laughter, but soon people began to wonder. What if it was true? The idea was terrifying, impossible! Nobody would vote for Byerley, if evidence was produced that he was a robot.

Those people who opposed the development of robots demanded new laws, and public anger began to grow. There were guards with guns around every US Robots office and factory, and police protection for Byerley day and night. Reporters and photographers waited outside Byerley's house, and interviewed scientists from US Robots. Soon, a city official with two policemen arrived to search Byerley's home.

Quietly, Byerley read the letter from one of the city judges. Then he nodded. 'Do your job.'

The official left the room with the two policemen to search the house. They were back in ten minutes.

'Mr Byerley, we want to search you. We've brought an X-ray machine.'

Byerley laughed and shook his head. 'You can't search me. I've read the description in the judge's letter of what you can search: my house, my garden, the garage and any other buildings in my garden. You can't search me.'

The men marched to the door. Then the official turned his hand in his pocket. 'You're a clever lawyer,' he said angrily. For a moment, he stood there. Then he left, waved to the reporters outside the house, and shouted, 'We'll have something for you tomorrow.'



In his car, he removed a tiny machine from his pocket and carefully inspected it. It was the first time he had taken an X-ray with the new machine. He hoped that he had done it correctly.

*

Quinn and Byerley had never met face to face. But the following day Quinn phoned Byerley on the videophone.

'I intend to tell the public that you're wearing special clothes which prevent X-ray photographs,' Quinn began. 'It's obvious that you don't dare face an X-ray.'

Byerley was friendly. 'I won't have an X-ray because I want to protect my private life. It's obvious that you don't care about anyone's private life - or about protecting people from unlawful behaviour. However, I do care, and voters might be interested in that difference between us.'

'A very interesting idea. But no one will believe you.' Quinn looked at the paper in his hand. 'Another thing: your friend isn't at your home.'

'My old teacher,' Byerley said calmly. 'He's in the country — has been for two months.'

'Your teacher? A scientist?'

'A lawyer, and a scientist, before his accident. His health is so poor that he can do little work now.'

Quinn was unsmiling. 'What does he know about robots?'

Byerley stared at Quinn's face on the video screen, but his expression did not change. 'I'm no judge of that.'

'Your teacher is the real Stephen Byerley. He created you. No one's going to vote for you. You're a robot.'

Byerley gave a wide smile. 'You won't be able to prove that. As for losing the election ... well, a while ago I was an unknown lawyer. Now, thanks to you, I'm world-famous.'

*

Berkeley's teacher came back to the city a week before the election.

'Your job went well?' Byerley asked.

'Well enough. There will be no trouble there.'

'There's some risk of violence in the city during the election, but I don't think it will be dangerous. Be sure to watch the television tomorrow, John.' And Byerley touched his hand gently.

*

The crowd was huge. Many people were angry, because they did not want a robot to be their new governor. From his platform, Byerley spoke slowly and calmly, but few listened. The screams and shouts from the angry crowd grew louder.

Then a tall, thin man pushed to the front of the crowd. 'Hit me!' he shouted.

'Quiet! Quiet!' shouted some people near him.

'Hit me!' the man said again. 'If you're not a robot, prove it. Hit me!' He climbed up on to the platform.



The crowd was silent now.

'I have no reason to hit you,' Byerley said clearly.

The thin man began to laugh wildly. 'You *can't* hit me. You *won't* hit me. You're not human. You're a machine — an ugly machine!'

And Stephen Byerley, in front of thousands in the crowd and in front of millions who were watching on television, lifted his arm and then hit the man hard on the chin. The man went over backwards with nothing on his face but surprise.

Dr Calvin, watching from a special seat in front, got up and walked away. One reporter ran after her.

Susan Calvin called over her shoulder, 'There's your evidence. He's human.'

*

Dr Calvin and Stephen Byerley met once again — a week before Byerley moved into the governor's house.

'I'm sorry that it ended like this,' the psychologist said. 'I like robots better than I like human beings. I'd like to see a robot governing the world. He'd be unable to harm human beings and so he'd govern better than any human being. Because of the Laws of Robotics, a robot could never be cruel, stupid or unjust. It would be the perfect answer to the problems of government.'

'Except that the positronic brain isn't as capable as the human brain.'

'He'd have advisers. Not even a human brain is capable of governing without advisers.'

Byerley considered Susan Calvin with interest. 'Why are you smiling, Dr Calvin?'

'Because Mr Quinn didn't think of everything. For three months before the election, your teacher was in the country for some mysterious reason. He returned just before that famous violence of yours. And after all, what he had done once, he could do a second time.'

'I don't quite understand.'

Dr Calvin rose. She was obviously ready to leave. 'I mean that there is one time when a robot may harm a human being without breaking the First Law.'

'And when is that?'

Dr Calvin was at the door. She said quietly, 'When the human being is another robot.'

And then she smiled widely, her thin face shining. 'Good-bye, Mr Byerley. I shall vote for you again, five years from now - as Regional Governor.'

The door closed behind her.



*

I stared at Dr Calvin with horror, is that true?'

'All of it,' she said.

'The great Byerley was a robot?'

'Oh, we can never find out. He arranged for his body to be destroyed, so there will never be any proof. But I believe that he was.'

'Yes, but -'

'No buts! Byerley was a very good City Governor, and five years later he did become Regional Governor. And in 2044 he became the first World Governor!'

There was silence for a long moment and then Dr Calvin got up from her chair. 'And that is all,' she said. I saw it from the beginning, when the poor robots couldn't speak, to now, when robots are the only real hope for the safety of human beings. I will see no more. My life is over. You will see what comes next.'

*

I never saw Susan Calvin again. She died last month at the age of eighty-two.