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Hemisphericity of the Brain and Foreign Language Teaching

Betty Lou Leaver

This paper is intended as a think-piece, a report on studies conducted in the Russian Section of the Foreign Service Institute (FSI), and as a means of raising questions and suggesting hypotheses which are adjunct to those currently under discussion by medical doctors and psychologists.[1] These questions have long remained the property of neurologists and neuropsychologists. It is the aim of this paper to remove these discussions from this exclusive domain and inject them into the methodological discussions and research of foreign language pedagogues, theorists, and researchers.

Hemisphericity research is not new to this century. In fact, as early as the 1870s such renowned doctors as Carl Wernicke and Paul Broca[2] were exploring the differences in functions between the various parts of the brain. However, the great bulk of the research into brain hemisphericity has been accomplished in the last two decades by such notable scholars as the brilliant doctor and diagnostician, Geschwind,[3] who explored the interrelationships between brain function and manifest human behavior, connecting such seemingly disparate phenomena as handedness, learning disabilities, pseudo-schizophrenia, and hormonal levels, Sperry,[4] who explored the dichotomized reactions to verbal and written speech stimuli in patients whose *corpus collosum*, the bundle of fibers which connect the right and left hemispheres of the brain, had been severed in attempts to control severe epilepsy, and Luria,[5] who had examined brain function in aphasic patients, as well as a host of current medical experts and psychologists who are continuing to explore more deeply, revise previous theories, and prove or disprove contemporary hypotheses.[6]

Although more is still unknown about hemispheric functioning

than is known, consensus currently assigns most speech functions to the left hemisphere. Only a small percentage of left-handed individuals have been found to be right-brain dominant for speech. All right-handed persons studied, ambidextrous individuals, and the majority of left-handers consistently display left dominance for speech. Specific speech characteristics which have been attributed to the left brain include phonemic discrimination, classification, redundancy, abstract nouns, verbs, grammatical signs (and some indication exists that morphology and syntax, which have yet to be unequivocally assigned to either hemisphere, are probably processed in the left), subordination, semantics, and the more complex features of speech which rely upon abstract and sequential processing of information. On the other hand, characteristics which have been attributed to the right brain include environmental sounds, concrete nouns, one-line descriptions, intonation, recognition of voices, interjections, cursing, colorful speech, understanding of and physical response to simple commands, and the more simple aspects of speech which rely upon emotional processing of information followed by physical reaction.

At FSI I sought correlations between hemisphere dominance and the development of language proficiency. Since 1983 I have identified entering students as belonging to one of thirteen patterns of hemisphere dominance, then tracked their performance during training. Students were administered the Torrance test[7] to determine hemisphere dominance. This test was rewritten to reflect two aspects of hemisphere dominance: innate and current. Innate hemisphericity is the dominance that was probably present in childhood, before American educational systems could influence preferred patterns of thinking and acting. Current hemisphericity is the dominance displayed at the time the test was given. Of course, simply the suggestion that hemisphere dominance can change during one's lifetime and as a result of environmental influences might cause shock waves in some psychological circles, but considering that the brain itself changes physiologically as the years pass (Kimura, 1985:85), the possibility of changed dominance should exist. Success in language learning was measured by end-of-training proficiency test scores of S/R-3 on the FSI scale of 0-5, where a 3 indicates minimum professional proficiency (equivalent to the *superior* rating on the ACTFL scale) and represents the typical outcome of the 44-week intensive language training course. The following tables summarize the results of this

study. In the tables the number 3 refers to those students who reached a S/R-3 on the proficiency test, 3+ refers to those students who exceeded a 3 and includes students who reached both 3+ and 4, and 3- refers to students who did not reach the 3. Strengths and weaknesses (S and W) in particular skill areas are also indicated, if there were discernible patterns. Finally, MT refers to an aptitude score above 60 on the Modern Language Aptitude Test (MLAT), which was administered to them prior to entering the FSI program. (The MLAT measures a student's ability to learn a language. Scores range from 30–80. A score of 60 is the lowest acceptable score for enrollment in hard language courses, such as Russian.)

Group 1
current: whole right
innate: right

3	100%
3+	0%
3-	0%
S	comprehension
W	grammar
MT	100%

(Note: Whole right refers to a dominance that shows up as marginally integrated, i.e., the point spread between integrated and right is less than 3 points, so that the dominance cannot be stated to be clearly integrated.)

Group 2
current: whole right
innate: whole right

3	67%
3+	16.5%
3-	16.5%
S	comprehension
W	grammar
MT	60%

Group 3
current: right
innate: right

3	100%
3+	0%
3-	0%
S	comprehension
W	grammar
MT	0%

Group 4
current: right
innate: whole right

3	0%
3+	0%
3-	100%
S	comprehension
W	grammar
MT	0%

Group 5
current: whole left
innate: whole left

3	25%
3+	25%
3-	50%
S	grammar
W	comprehension
MT	0%

Group 6
current: whole left
innate: integrated

3	0%
3+	100%
3-	0%
S	grammar
W	comprehension
MT	100%

Group 7
current: whole left
innate: whole right

3	0%
3+	100%
3-	0%
S	grammar
W	comprehension
MT	100%

Group 8
current: left
innate: left

3	25%
3+	0%
3-	75%
S	
W	
MT	50%

(Note: A strange pattern emerged here: if the MLAT score was above 60, S was grammar, W was comprehension; if the MLAT score was below 60, S and W were reversed.)

Group 9
current: left
innate: whole left

3	0%
3+	0%
3-	100%
S	
W	
MT	50%

(Note: The same S-W pattern was noticed here as in the above group.)

Group 10
current: left
innate: integrated

3	100%
3+	0%
3-	0%
S	grammar
W	comprehension
MT	100%

Group 11
current: left
innate: whole right

3	50%
3+	50%
3-	0%
S	
W	
MT	100%

Group 12
current: integrated
innate: integrated

3	100%
3+	0%
3-	0%
S	grammar
W	comprehension
MT	0%

Group 13
current: integrated
innate: whole right

3	67%
3+	33%
3-	0%
S	
W	
MT	100%

(Note: Again, there is no clear-cut S-W pattern, with 50% showing S-comprehension and W-grammar and 50% showing the

reverse.)

The patterns illustrated above become clearer if all students are combined in accordance with their current dominance, although in individual instances the innate dominances can be shown to affect foreign language learning success. These cases are also indicated below. When the dominances are combined, another phenomenon appears—plateaus in language learning, or those times when language learning processes seem to dramatically slow down. (Of course, the question remains whether a plateau actually indicates a slowdown in language learning processes or simply a change in their nature.) The speaking levels, in accordance with the FSI scale, at which plateaus were customarily reached are indicated by P. A blank beside P indicates that no plateaus were discerned.

all right dominances

3	50%
3+	10%
3-	40%
S	comprehension
W	grammar
MT	30%
P	2+/3

all left dominances

3	25%
3+	31%
3-	44%
S	grammar
W	comprehension
MT	64%
P	1+/2

all left dominances with innate right or integrated

3	33%
3+	67%
3-	0%
S	
W	
MT	100%
P	

all integrated dominances

3	75%
3+	25%
3-	0%
S	
W	
MT	75%
P	

A comparison of the above charts shows a clear connection between hemispericity and success in foreign language learning in a hard language presented in an intensive 6-hour-per-day environment, when aptitude, as indicated on the MLAT, is held constant. Overall, 30% of right hemisphere dominant students had MLATs above 63 and 70% of them reached 3 or better, with 10% exceeding 3; 64% of the left hemisphere dominant students had MLATs above 63 but only 56% reached 3 or better, with 11% exceeding 3; 75% of the students with fully integrated hemispheres had MLATs above 63 and 100% of them reached 3 or better, with 25% exceeding 3. Additionally, those students exhibiting right brain dominance reached plateaus around the 2+/3 level; whereas those students exhibiting left brain dominance reached plateaus around the 1+/2 level and students exhibiting an integration of hemispheres did not seem to reach any plateaus while in training. For those students who plateaued at the 3 level little remediation could be applied, since the 3 was reached within 1-3 months of completing the course. For those students plateauing around the 1+/2 level, i.e., earlier in the course, there was adequate time for remediation, and a number of these students were assisted in achieving higher proficiency levels as a result.

Interestingly, the greatest percentage of left-brain dominant students reached either 2+ or 3+. Relatively few tested at 3. An analysis of these students' progress indicates that those who reached 3+ actually reached a 3 significantly later than did many of the right-brain dominant students, who subsequently plateaued and progressed no further. The left-brain dominant students did not plateau at 3, however, but progressed extraordinarily rapidly from 3 to 3+, sometimes in only one month.

One hypothesis that might account not only for this phenomenon but also for the discrepancy in the levels at which

left-brain dominant and right-brain dominant students plateau is that L_2 is not initially processed neurologically in the same manner that L_1 (already acquired) is processed. Perhaps left-brain dominant students plateau early because increasingly greater demands on their right, nondominant hemisphere slow progress. Once they reach a 3, however, they can access their dominant left hemisphere, and progress accelerates. Similarly, perhaps right-brain dominant students plateau later as the level of abstraction of the language tasks increases and more closely approximates L_1 speech functions. Having reached the 2+/3 line, they must begin to challenge their left, nondominant hemisphere, whereas their progress during the early stages of language study was smooth and successful, because they were accessing and relying on their dominant hemisphere.

This hypothesis finds support in two other studies. One, conducted by Mary Call of the University of Pittsburgh,[8] ascertained that language students showed a left ear preference for intonation until they reached approximately a level 3, indicating right-brain processing, and a right-ear preference thereafter, indicating a change to left-brain processing. She concluded that intonation was perceived similarly to music and, therefore, was processed by the right brain in the early stages of language study. In later stages it was perceived as speech and processed in the left hemisphere. The tendencies found in the FSI students suggest that perhaps one can generalize from intonation to language as a whole. Perhaps all foreign language is initially processed in the right hemisphere and only begins to be processed as speech, in the left hemisphere, around level 3. (We now need an ear preference study for language features other than intonation!)

The second study which lends support to this hypothesis is currently being conducted in the Russian Section of FSI. It is too early to form conclusions, but some patterns are already obvious. The study involves "listening in" on students who are working in small groups to understand short, real-life dialogues which are significantly beyond their current level of knowledge of structure and vocabulary. As a group, however, the students are able to piece together the gists of these dialogues. The study analyzes the process students collectively and individually employ in order to effect comprehension. The most common procedure, used by almost all the students, particularly in the earliest phases of the course, is the isolation of several concrete nouns and the weaving

of them into a plausible scenario. A second device is the recognition and selection of emotionally tinged words, which serve as a check to ensure that the imagined scenario is feasible. Since concrete nouns and emotionally-charged language are processed in the right hemisphere,[9] it is logical to assume that at this point it is the right hemisphere which is assuming the superior role in language learning/acquisition.

Whichever hemisphere is most involved at each stage of language study is less important, however, than the probability that both hemispheres are needed for success. Not only would this conclusion seem reasonable simply based on the fact that each hemisphere has its own language processing functions, but it is readily apparent as well from the charts on the preceding pages. The greatest success was achieved by those students who were integrated or who displayed current left-brain dominance with innate whole-right dominance.

One might assume that the opposite combination would be equally effective: current right-brain dominance and innate whole-left dominance. If the patterns found in the students studied are maintained in the same proportion for larger groups of students, however, that combination will rarely, if ever, appear. Between birth and adulthood 65% of those tested shifted leftwards in terms of dominant hemisphere; only 5% shifted rightward. The pervasive influence of American public schools, which are acknowledged left-brain institutions,[10] is readily apparent!

If these results do hold over a larger group, there are several major contributions that analysis of the data can make to the foreign language classroom. First, these data permit the formulation of a description of an ideal student, or more importantly, permit the converse—the ability to predict learning difficulties and to prepare for them. One should be able to determine in advance which students will encounter difficulties at each stage in the language learning/acquisition process, which students will be frustrated at each stage and by what teaching techniques, and which students will use current materials effectively. And indeed, these data, along with learning styles studies, have identified and "saved" several failing students over the past three years, students, who until thus diagnosed were labelled "slow learners" or "untalented at language learning" and who were destined not to reach the required proficiency levels (S-3, R-3). In general, the left-brain dominant students at FSI

tend to be deductive, analytic, sight learners who are dismayed at language acquisition activities but relish grammar drills, explanations, memorization, translation, and any other pure learning activity. Right-brain dominant students, on the other hand, tend to be inductive, global-processing, ear learners who readily accept acquisition activities but experience great difficulty trying to memorize a language and usually cannot activate knowledge which they have gained through language learning activities.

Second, along the same lines, these data permit judicious use of ability tests, such as the MLAT. FSI uses a score of 60 as a cut-off for entry into hard language programs, the category into which Russian falls. Interestingly, no clear-cut patterns emerged when this line of demarcation was employed. However, the use of 63 as a dividing line allowed students to be readily grouped. It is as yet unknown whether this is just coincidental to this group of students or whether 63 is a better predictor of success for all students. Additionally, the data clearly delineates one group of students who score poorly on the MLAT but who are successful in language training—right brain dominant students, who, from all appearances, are language acquirers. The MLAT does not test language acquisition ability but rather language learning ability. It is not surprising, therefore, that left-brain dominant students tend to perform better on the test than do their right-brain counterparts. In using the test score as a criterion for course eligibility, then, it might be wise to consider the hemisphericity of those students whose scores fall below 60.

Third, these data might assist classroom teachers with selection of teaching methodologies. The success of a methodology such as Total Physical Response (TPR)[11] in the early phases of a training program could be explained by its ability to address language study to the right hemisphere. On the other hand, if the teacher has a classroom of left-brain dominant students, there might be some motivation to choose a more traditional drill or translation approach for at least part of the program, in order to satisfy students' need to use their strengths, not their weaknesses, in mastering the foreign language. Or the teacher might decide that these students really do need acquisitional methodology, such as the Natural Approach,[12] in order to develop their right hemisphere, which does, indeed, play a role in language learning/acquisition.

Moreover, given such input, the teacher can more highly

individualize instruction, providing cognitive code activities to those who need them, Natural Approach activities to others who need them. The left-brain, sight learner can be encouraged to strengthen his ear and acquisitional skills by sometimes being allowed to read along as he listens to a passage or by being permitted to memorize short phrases as crutches until he is ready to cease striving for perfection and to risk speech and perhaps error. The right-brain, ear learner can be coaxed into improving structural control, not through grammar drills, which are anathema and dull to him, but through planned speaking activities which foster the development of conscious self-monitoring of his own speech. The left-brain dominant student can be shown how to build global pictures, which so often escape him while his mind is focussing on details. The right-brain learner can be taught to use the readily-constructed global picture as a framework of expectations in retrieving details otherwise bypassed. Textbook exercises can be analyzed as to which hemisphere they draw upon and amended to better suit the class in question.

Such data can begin to provide an insight into the complexity of the neurolinguistic processing of speech, as well as an indication that such processing may not be the same for all people. Thus, no one language training program would be adequate for all students. Adequacy of language programs might well be measured not by their content but by class composition and extent to which students can access whichever hemisphere is needed for textbook/program activities.

To make any statement about hemisphericity with confidence, however, much more data is needed. What has been collected to date serves to raise more questions than it answers. If language really is processed via the right hemisphere in the earliest stages of L_2 study, must acquisition precede learning for the attainment of language competency? How much should teachers require students to develop their nondominant hemispheres? To what extent is it possible to develop them? What would happen to right-brain students if they remained in class another two or three months—would they leave their plateaus and reach a 3+? What is the specific relationship between various preferred learning styles (ear/sight, deductive/inductive) and hemisphericity?

This paper cannot at this time adequately address such questions. It can only pose them, to seek to open a door into further research and study of the effect that hemisphericity may

have on learning and ultimately on language teaching.

Foreign Service Institute
U.S. Department of State

Notes

[1]While twenty years ago one could list all researchers on brain hemisphericity by name, there is now a plethora of such researchers, particularly in medicine and psychology. Among the better known (in addition to those described in this paper) are D. Kimura, G. Deutsch, M. S. Gazzaniga, J. E. Bogen, E. H. Lenneberg, M. Kinsbourne, J. A. Wada, J. Levy, C. Trevarthen, and W. Levitsky. (For specific works see bibliography.)

[2]Of the researchers involved in hemisphere study in the 1800s, probably the best-known are Karl Wernicke, a neurologist, and Paul Broca, a surgeon. Wernicke discovered that the hind part of the left temporal lobe—now called Wernicke's area—is critical for comprehension of spoken language. Broca made many contributions to the study of aphasia and located a critical site in the left frontal lobe—now called Broca's area—which is essential for speech production. He also was the first to identify speech in general as a function of the left hemisphere.

[3]Norman Geschwind, a surgeon, has been a controversial figure in brain research. While many of his hypotheses and statements have later been shown to be correct, he has often been criticized by his colleagues for his intuitive approach to research. There is no dearth of articles by him, particularly in tandem with other researchers. His contribution is to the study of anatomical asymmetries of the brain and their reflection in speech features, handedness, and other areas.

[4]R. W. Sperry has devoted much attention to behavioral and language-related phenomena associated with post-comissurectomy patients (the "split-brain" procedure having been carried out to control intractable epilepsy).

[5]Luria, a Russian psychologist, worked principally in the area of aphasia.

[6]In addition to these specialists, a few linguists and at least one pedagogue have approached the topic from a psycholinguistic point of view: S. Krashen (lateralization, language development, and critical period), T. Scovel (lateralization), E. H. Lenneberg (lateralization), R. Jakobson (specificity of hemisphericity), and N. Chomsky (influence on language of comissurectomy).

[7]This test was developed by E. Paul Torrance, Cecil R. Reynolds, Theodore Riegel, and Orlow Ball of the University of Georgia in May 1976 and published in *The Gifted Child Quarterly*, Winter 1977, Vol. XXI, No. 4.

[8]For more information about this study see Mary Emily Call, "Ear Preferences for Intonation Patterns in Second Language Learners" [paper presented at TESOL 1980]. A discussion of the same subject can be found in her dissertation, *On the Relationship Between Auditory Short-Term Memory and Listening Comprehension in a Foreign Language*, University of Pittsburgh, 1979 (unpublished). Another scholar working in the same area is E. Zurif, who has published several articles on this topic, among them "The Role of Syntax in Dichotic Listening," *Neuropsychologia* 8:239–44.

[9]For a description of language functions by hemisphere, see Roman Jakobson, *Kindersprache, Aphasie, und Allgemeine Lautgesetze*. Upsala, 1941.

[10]For a detailed discussion see J. E. Bogen, "The Other Side of the Brain. VII: Some Educational Aspects of Hemispheric Specialization," *UCLA Educator* 17 (1975):24–32. Here and elsewhere he describes typical school programs as developing propositional thinking—a left brain function, as well as showing that instruments, such as IQ tests, used for prediction or measurement of school success are principally measurements of left-brain abilities.

[11]For a description of TPR, see James Asher, *Learning Another Language Through Actions: The Complete Teacher's Guidebook*. Los Gatos, CA: Sky Oaks Productions, 1982.

[12]For an introduction to the principles of the Natural Approach, see Stephen Krashen and Tracy Terrell. *The Natural Approach: Language Acquisition in the Classroom*. San Francisco: Alemany Press, 1983.

References

Asher, James. *Learning Another Language Through Actions: The Complete Teacher's Guidebook*. Los Gatos, CA: Sky Oaks Productions, 1982.

Bogen, J. E. "The Other Side of the Brain. VII: Some Educational Aspects of Hemispheric Specialization" in *UCLA Educator* 17 (1975), pp. 24–32.

Call, Mary Emil. "Ear Preferences for Intonation Patterns in Second Language Learners" [paper presented at TESOL 1980].

_____. *On the Relationship Between Auditory Short-Term Memory and Listening Comprehension in an Foreign Language*. university of Pittsburgh: unpublished dissertation, 1979.

Carammazza, A. and E. Zurif. *Language Acquisition and Language Breakdown*. Baltimore: Johns Hopkins University Press, 1978.

Chomsky, N. *Language and Mind*. New York: Harcourt Brace, 1972.

Dennis, M. and H. Whitaker. "Language Acquisition Following Hemidecortication: Linguistic Superiority of the Left Over the Right Hemisphere" in *Brain and Language* 3 (1976), pp. 404–433.

Dimond, S. *The Double Brain*. London: Churchill-Livingstone, 1972.

_____ and G. Beaumont, ed. *Hemispheric Function in the Human Brain*. New York: Halsted Press, 1974.

Gazzaniga, M. S. *The Bisected Brain*. New York: Appleton-Century-Crofts, 1970.

_____ and S. A. Hillyard. "Language and Speech Capacity of the Right Hemisphere" in *Neuropsychologia* 9 (1971), pp. 273–280.

_____ and J. E. Le Doux. *The Integrated Mind*. New York: Plenum Press, 1978.

Geschwind, N. and W. Levitsky. "Human Brain: Left-Right Asymmetries in Temporal Speech Region" in *Science* 161 (1968), pp. 186–7.

Jakobson, Roman. *Kindersprache, Aphasie, und Allgemeine Lautegesetze.* Upsala, 1941.

Joynt, R. J. "Paul Pierre Broca: His Contribution to the Knowledge of Aphasia" in *Cortex* 1 (1964), pp. 206–213.

Kimura, Doreen. "Functional Asymmetry of the Brain in Dichotic Listening" in *Cortex* 3 (1976), pp. 163–178.

_____. "Left Brain, Right Brain: The Hidden Differences" in *Psychology Today*, November 1985, p. 85.

_____. "Left-Right Differences in the Perception of Melodies" in *Quarterly Journal of Experimental Psychology* 16 (1964), pp. 355–358.

_____ and S. Folb. "Neural Processing of Backwards Speech Sounds" in *Science* 161 (1968), pp. 395–396.

Kinsbourne, M., ed. *Asymmetrical Function of the Brain.* Cambridge: Cambridge University Press, 1978.

Krashen, Stephen. "Lateralizaton, Language Learning, and the Critical Period: Some New Evidence" in *Language Learning* 23 (1973), pp. 63–74.

_____ and Tracy Terrell. *The Natural Approach: Language Acquisition in the Classroom.* San Francisco: Alemany Press, 1983.

LeDoux, J. E., G. Risse, S. P. Springer, D. H. Wilson, and M. S. Gazzaniga. "Cognition and Comissurectomy" in *Brain* 100 (1977), pp. 87–104.

Lenneberg, E. H. *Biological Foundatons of Language.* New York: Wiley, 1967.

Luria, A. R. *Traumatic Aphasia.* The Hague: Mouton, 1970.

Milner, B., ed. *Interhemispheric Relations and Cerebral Dominance.* Baltimore: Johns Hopkins Press, 1962.

Molfese, D. L., R. B. Freeman, Jr., and D. S. Palermo. "The Ontogeny of the Brain Lateralization for Speech and Nonspeech Stimuli" in *Brain and Language* 2 (1975), pp. 356–368.

Myers, R. E. and R. W. Sperry. "Interhemispheric Communication Through the Corpus Collosum. Mnemonic Carry-Overy Between the Hemispheres." *Archives of Neurology and Psychiatry* 80 (1958), pp. 298–303.

Ornstein, R. "The Split and Whole Brain" in *Human Nature* I (1978), pp. 76–83.

Satz, P. D., J. Bakker, J. Teninussen, R. Goebel, and H. Van der Vlugt. "Developmental Paramenters of the Ear Asymmetry: A Multivariate Approach" in *Brain and Language* 2 (1975), pp. 171–85.

Springer, Sally P. and Georg Deutsch. *Left Brain, Right Brain.* San Francisco: W. H. Freeman and Company, 1981.

Taylor, J., ed. *Selected Writings of John Hughlings Jackson.* New York: Basic Books, 1958.

Zurif, E. "The Role of Syntax in Dichotic Listening," in *Neuropsychologia* 8:239–44.

American Interference in the Russian Language of the Third-Wave Emigration: Preliminary Notes[0]

Hugh M. Olmsted

Staneš ty amerikancem,
Obreteš' pokoj,
Budeš' tože inostrancem
S russkoju dušoj.

Simon Lempert
Èmigrantskaja kolybel'nja

Živite poka, i molite Boga,
čtoby ja kak možno dol'še
ne ovladel pravil'nym anglijskim
jazykom.

Eduard Limonov
Èto ja—Edička

To the average American there would seem to be little in common between a pot-holder (for taking hot things from the stove) and an eraser (for blackboards). And yet there is at least one major European language in which the two notions can be expressed with one and the same word. The language is Russian, and the word is *trjapka* (normally glossed as 'rag').[1] Of course, to refer to discrepancies in consumer technology between the Soviet Union and America is nothing new. Nor is it necessarily a rebuke against things Russian: the rebuke may if anything be directed towards America. Aleksandr Zinov'ev, still in the Soviet Union before his emigration, once welcomed a friend back from a visit abroad. As a joke the traveller had brought back to Moscow with him a small, quite unrecognizable Western gadget. He made