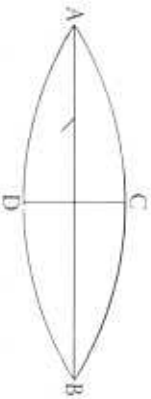


whether it is hot or cold, dry or wet, clear or cloudy, and numerous other factors. Moreover, the same can be said in general about all the questions you raise about air resistance: the degree of resistance varies depending on whether the weight is made of lead or iron or wood, on whether it is round or square or some other shape, and numerous other factors.

As for the to and fro motions of a cord which is plucked by the thumb away from its straight-line position, I say that in a vacuum these motions decrease in geometrical proportion. That is to say, if CD is 4 at the first



motion and 2 at the second motion, it will be only 1 at the third motion; and if it is 9 at the first motion and 6 at the second, it will be 4 at the third, and so on in due order. Now as a consequence of this, the speed of the motion always decreases in the same proportion, provided the last to and fro motions take as much time as the first ones. I say 'in a vacuum', for in air I believe that the motions will be a little slower towards the end than they were at the beginning, because the motion will have less force then, and hence will not so easily overcome the air resistance. Yet I am not sure about this; perhaps on the contrary the air even aids the motion at the end, since the motion is circular. But you can put this to the test with your ear, if you investigate the question whether the sound of a plucked cord is sharper or flatter at the end than at the beginning; for if it is flatter, that means that the air is retarding it, whereas if it is sharper, that means that the air is making it move more quickly . . .

ATI
TO MERSENNE, 20 NOVEMBER 1629

76 This project for a new language seems more remarkable at first than I find it to be upon close examination. There are only two things to learn in any language: the meaning of the words and the grammar. As for the meaning of the words, your man does not promise anything special; for in his fourth proposition he says 'the language is to be translated with the aid of a dictionary', and any linguist can do as much in all common languages without his aid. I am sure that if you gave M. Hardy¹ a good dictionary of

¹ Probably Descartes' friend Claude Hardy (1605–78), a mathematician who is reported to have known thirty-six oriental languages.

Chinese or any other language, and a book in the same language, he would guarantee to work out its meaning. 77

The reason why not everyone could do the same is the difficulty of the grammar. That, I imagine, is your man's whole secret; but there is no difficulty in it. If you make a language with only one pattern of conjugation, declension and construction, and with no defective or irregular verbs introduced by corrupt usage, and if the nouns and verbs are inflected and the sentences constructed by prefixes or suffixes attached to the primitive words, and all the prefixes and suffixes are listed in the dictionary, it is no wonder if ordinary people learn to write the language with the aid of a dictionary in less than six hours, which is the gist of his first proposition.

The second says 'once this language has been learnt, the others can be learnt as dialects of it'. This is just sales talk. He does not say how long it would take to learn them, but only that they could be regarded as dialects of his language, which he takes as primitive because it does not have the grammatical irregularities of the others. Notice that in his dictionary, for the primitive words, he could use the words of every language as synonyms of each other. For instance, to signify *love*, he could use *amier*, *amare*, *phæiv*, and so on; a Frenchman, adding to *amier* the affix for a noun, will form the noun corresponding to *amour*, a Greek will add the same affix to *phæiv*, and so on. Consequently his sixth proposition, about 'inventing a script', is very easy to understand. For if he put into his dictionary a single symbol corresponding to *amier*, *amare*, *phæiv* and each of the synonyms, a book written in such symbols could be translated by all who possessed the dictionary. 78

The fifth proposition, too, it seems to me, is simply self-advertisement. As soon as I see the word *arcanium* [mystery] in any proposition I begin to suspect it. I think he merely means that he can teach the languages he names more easily than the average instructor, because he has reflected much about their grammars in order to simplify his own.

There remains the third proposition, which is altogether a mystery to me. He says that he will expound the thoughts of the writers of antiquity from the words they used, by taking each word as expressing the true definition of the thing spoken of. Strictly this means that he will expound the thoughts of these writers by giving their words a sense they never gave them themselves; which is absurd. But perhaps he means it differently.

Now this plan of reforming our grammar, or rather inventing a new one, to be learnt in five or six hours, and applicable to all languages, would be of general utility if everyone agreed to adopt it. But I see two difficulties which stand in the way.

The first is discordant combinations of letters which would often make the sounds unpleasant and intolerable to the ear. It is to remedy this defect 79

that all the differences in inflexion of words have been introduced by usage; and it is impossible for your author to have avoided the difficulty while making his grammar universal among different nations; for what is easy and pleasant in our language is coarse and intolerable to Germans, and so on. The most that he can have done is to have avoided discordant combinations of syllables in one or two languages; and so his universal language would do only for a single country. But we do not need to learn a new language to talk only to Frenchmen.

The second difficulty is in learning the words of the language. It is true that if each person uses as primitive words the words of his own language, he will not have much difficulty; but in that case he will be understood only by the people of his own country unless he writes down what he wants to say and the person who wants to understand him takes the trouble to look up all the words in the dictionary; and this is too burdensome to become a regular practice. If your man wants people to learn primitive words common to every language, he will not find anyone willing to take the trouble. It would be easier to get everyone to agree to learn Latin or some other language in current use than one where there are as yet neither books for practice in reading nor speakers for practice in conversation. So the only possible benefit that I see from his invention would be in the case of the written word. Suppose he had a big dictionary printed of all the languages in which he wanted to make himself understood, and put for each primitive word a symbol corresponding to the meaning and not to the syllables, a single symbol, for instance, for *aimer*, *amare* and *phœcur*; then those who had the dictionary and knew his grammar could translate what was written into their own language by looking up each symbol in turn. But this would be no good except for reading mysteries and revelations; in other cases no one who had anything better to do would take the trouble to look up all these words in a dictionary. So I do not see that all this has much use. Perhaps I am wrong; I just wanted to write to you all I could conjecture on the basis of the six propositions which you sent me. When you have seen the system, you will be able to say if I worked it out correctly.

I believe, however, that it would be possible to devise a further system to enable one to make up the primitive words and their symbols in such a language so that it could be taught very quickly. Order is what is needed: all the thoughts which can come into the human mind must be arranged in an order like the natural order of the numbers. In a single day one can learn to name every one of the infinite series of numbers, and thus to write infinitely many different words in an unknown language. The same could be done for all the other words necessary to express all the other things which fall within the purview of the human mind. If this secret were

discovered I am sure that the language would soon spread throughout the world. Many people would willingly spend five or six days in learning how to make themselves understood by the whole human race.

But I do not think that your author has thought of this. There is nothing in all his propositions to suggest it, and in any case the discovery of such a language depends upon the true philosophy. For without that philosophy it is impossible to number and order all the thoughts of men or even to separate them out into clear and simple thoughts, which in my opinion is the great secret for acquiring sound knowledge.¹ If someone were to explain correctly what are the simple ideas in the human imagination out of which all human thoughts are compounded, and if his explanation were generally received, I would dare to hope for a universal language very easy to learn, to speak and to write. The greatest advantage of such a language would be the assistance it would give to men's judgement, representing matters so clearly that it would be almost impossible to go wrong. As it is, almost all our words have confused meanings, and men's minds are so accustomed to them that there is hardly anything which they can perfectly understand.

I maintain that such a language is possible and that the knowledge on which it depends can be discovered, thus enabling peasants to be better judges of the truth of things than philosophers are now. But I do not hope ever to see such a language in use. For that, the order of nature would have to change so that the world turned into a terrestrial paradise; and that is too much to suggest outside of fairyland.

TO MERSENNE, 18 DECEMBER 1629

AT 1

I was astonished to hear that you have often seen a corona around a candle; apparently just as you describe it, and that you have a device which enables you to see it at will. I rubbed and rolled my eyes in all sorts of ways to try to see something similar, but with no success.² I am willing to believe, however, that the cause of this must have to do with the liquid of the eye; and this is something that could easily be confirmed if not everyone saw the coronas at the same time. I would like to know at what time you see the coronas: whether it is at night, when your eyes are laden with the vapours of sleep, or after having read for a good while, or whether you have been awake for some time or have gone without food; whether it is during a dry or rainy spell, whether indoors or out in the open air, etc. Having settled that question, I think I could explain the matter. The

¹ *Et science*, Descartes' term for systematic knowledge based on indubitable foundations.

² Descartes eventually observed these coronas in 1635; see below, p. 48.