SCIENCE NEWS

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A NEW BLOOD TEST

CASES of doubtful parentage of children, such as agitate the courts from time to time, may possibly be decided with more certainty in the future, if a new blood test originated by two British investigators is developed to a point that now appears possible. The first experiments leading to the new technique were performed on cattle in Egypt by Dr. C. Todd and Dr. R. G. White, and further researches were conducted on fowls in England by Dr. Todd working alone.

The test depends on the reactions of blood to foreign bodies that get into it. Blood invaded by germs, blood corpuscles of another animal, or anything else that does not belong there, generates substances to fight against the invaders. These substances are known by the general name of "antibodies." The familiar antitoxins used against various diseases belong to the antibody classification.

Foreign corpuscles that find their way into the blood stream are attacked by two different types of antibody. One of them tends to dissolve the outsiders and is called a "hemolysin," or simply "lysin." The other makes them stick together in clumps, and is called an "agglutinin." Both lysin and agglutinin reactions were used in these researches, the former in the cattle work, the latter in the work on fowls.

Following hints contained in earlier researches, Dr. Todd and Dr. White first found that antibody reactions are not the same if corpuscles from different animals are used with the same blood sample, and that conversely blood corpuscles from the same lot will dissolve less readily in one individual's blood serum than they do in another's.

The key to their discovery came when they found it was possible to "exhaust" the antibody in a given preparation of sensitized serum. By adding considerable quantities of corpuscles from one individual to such a serum sample, a point is finally reached where that serum will no longer have any effect on corpuscles from that particular source, though it will continue to destroy any other corpuscles that are added to it.

To do away with the large individual differences in reactions of separate lots of serum, "polyvalent" sera, obtained by mixing together sensitized sera from a large number of different animals, was prepared. This ironed out the individual variations, and made the mixture about equally effective against all corpuscles of the species used in its production. When this serum was "exhausted" with corpuscles from a single individual, it became highly selective, sparing those corpuscles only and destroying all others, except that in some instances it was not so destructive to blood corpuscles from animals nearly related to the test specimen.

The possibility of testing blood relationship was thought of by Dr. Todd when he was working on his fowls in England. He bred three different families of chickens, and tested blood obtained from the chicks against the corpuscles of their parents. In all cases but one, there was a strong "family reaction," the blood corpuscles of both parent fowls combined reacting toward the chick serum as the chick's own corpuscles would. Taken separately, either paternal or maternal corpuscles might fail to react; though where one failed the other always reacted. Thus a negative test would not necessarily indicate that parenthood could be denied, but a positive test would definitely mean that the individual so reacting, and none other, could be the parent.

So sure was Dr. Todd of the validity of his test that in the one case that failed, he tried the "errant" chick's blood against the parental corpuscles in his two other fowl families. It fitted one of these, and he concluded that there had been a mistake in marking the eggs before hatching, causing a mix-up in his records, and that the chick really belonged where its blood indicated and not where the note-book put it.

ST. VITUS' DANCE IN CHILDREN

FEVERS, used these days to burn out certain ailments of the human system, now seem to check St. Vitus' dance in children.

Twenty-four children have been treated by fevers artificially produced by manufactured serum. Dr. Lucy Porter Sutton, working in Bellevue Hospital in New York City, reported these cases to the American Medical Association. The average time of the children in the hospital was nine days. Sixty-three cases used for comparison treated by other means stayed on an average of forty-seven days in other hospitals. The usual treatment is rest and quiet. Dr. Sutton used typhoid-paratyphoid serum because it gave fevers for successive days which promptly stopped the symptoms. The discovery was an accident. Dr. Sutton was treating an extreme case of St. Vitus' dance in a boy. He was given a drug as a sedative. It had no beneficial effect and only aggravated the disease. But through a misunderstanding the drug was not stopped until the thirteenth day when a rash and a fever developed. This was traced to poisoning from the drug. It was noted, however, that the disease abruptly improved, after an irregular fever that rose as high as 106.4 degrees. A consideration of various factors convinced Dr. Sutton that it was the fever that cured.

She then tried small doses of typhoid serum because it was a safe and simple way of giving fever, and found it effective in cases tried. Later, typhoid-paratyphoid serum was chosen because it was a still simpler, safer and cheaper way of giving fever. The twenty-four experimental cases were treated in this way more rapidly and more satisfactorily than any other cases of St. Vitus' dance which had heretofore been treated in

Bellevue Hospital. But Dr. Sutton still considers the treatment in an experimental stage.

Fever treatment of disease is already well-known in the case of extreme syphilis or paresis.

HIGH WINDS AND THE PROBLEM OF FIRE CONTROL

UNPRECEDENTED high winds which parch the land and sweep flames along tree tops have made the fire control problem in northwest forests exceedingly acute. Western Montana and Northern Idaho are the focus of raging conflagrations which have cost homes and lives of stock, and have ruined hundreds of productive acres.

Eastern Montana is drier now than ever before, while the whole state, as well as Washington, Idaho and Oregon, suffer from the cumulative effect of a drought increasing steadily for the last ten or eleven years. Lack of spring rains, according to Roy Headley, of the U. S. Forest Service, resulted in forest fires breaking out in these states in April of this year. Never before at such an early date, he said, have such destructive blazes been encountered.

During the latter part of June, some precipitation occurred in the northwest region, but was quickly nullified by the intense wind and heat which dried up the moisture. Wyoming, Colorado, Utah and South Dakota have been in the grip of the drought until recently when some rainfall occurred. In Arizona and New Mexico summer rains have made conditions normal. Destruction by fire has been reported to forests throughout the west; since July, fires have not been serious along the Atlantic coast. In general, the drought conditions and resulting fires are believed to be considerably worse this year than last.

Figures from the U. S. Forest Service show that already in the national forests alone, at least 251,000 acres have been severely burned, while the total for 1930 was only 205,000 acres, and the season of fires is far from being over.

Because of the unusually high winds, fire fighters have frequently found it impossible to cope with the sweeping flames. Where the fires advance along the ground, ditches may be dug and backfires started to clean the land and cause the fire to die out. But when nature's bellows fan the flames into the tops of trees, there is no stopping the fire and fighters must flee for their lives.

Lightning is charged with causing almost two thirds of the fires in the Pacific northwest. Lookouts posted at strategic points report them as soon as sighted and the rush begins to surround the burning area and prevent it from enlarging. Sometimes it is possible to look at a storm and tell whether it is the kind likely to cause a fire. Besides the natural agencies, Mr. Headley stated, the careless smoker is the worst. Despite the precautions taken, untold damage results annually from the habits of man himself.

THE NEXT U. S. NAVY AIRSHIP

ALTHOUGH the next U. S. Navy airship to be built is ordered as a duplicate of the new *Akron,* the future craft will in all probability be a far better ship. Final work is now being done on the *Akron,* which is nearly twice as large as the *Graf Zeppelin,* preparatory to trial flights planned for the next few weeks. The next airship will be superior not because of any radical changes in design engineers might make with the approval of the Navy, but rather as the result of refinement of individual features and details indicated by experience with the *Akron.* It will be a matter of following the immediate precepts of experience, as teacher.

This kind of development, in the opinion of Dr. Karl Arnstein, designer of the *Akron* and formerly in charge of the design and building of seventy military and commercial airships for Germany, is what the aviation industry needs just now in order to make greatest progress.

Dr. Arnstein states that the aviation industry is well past the pioneering stage in both the lighter and heavier-than-air branches, and that the possibilities of flight have been conclusively demonstrated and now we have available a variety of ships suitable for all types of commercial operation. From now on, what we need is less invention and more application of the basic principles we have already learned. It is surprising what great progress can be made when invention is neglected and application emphasized.

Dr. Arnstein referred to his work in Germany during the war when there was not time for research and Zeppelins had to be built as fast as possible according to previously worked-out designs. By careful attention to the details and without making any radical changes, he said, he and his engineers were able to build the *LZ–62* so that it would carry a load of ten tons more than previous ships of the same size and general design which lacked detail refinements.

Just what changes are to be suggested to the Navy will not be definitely known until the *Akron* takes to the air and her behavior is studied. Then engineers will see where improvements can be made. For example, it is doubtless true that in their desire to make the *Akron* a safe airship, the engineers often used unnecessarily large factors of safety. These can be trimmed down to give the ship greater carrying capacity.

Dr. Arnstein said that he is sure the new outriggers which project the propellers beyond the ship's surface could be built with less weight and resistance, after engineers have had an opportunity to study them sufficiently. Likewise, he believes the radiators, which belt the huge framework at each engine and condense water from exhaust gases to make up for the loss of weight of fuel, can be designed more efficiently.

THE FREQUENCY OF WORDS USED OVER THE TELEPHONE

ONE thousand people spoke, using 80,000 words, of which only 2,240 were different. And of these different words, 819 were used only once. Thus 99 per cent. of 80,000 words of conversation was made up of only 1,421 words used over and over again many times.

Thus might be summarized findings of a study of the words and sounds of telephone conversation reported in the Bell System Technical Journal. Obviously this study, conducted by Norman R. French, Charles W. Carter, Jr., and Walter Koenig, Jr., points an accusing finger at the diminutive vocabulary of the average American, even when 500 different people pool their resources of speech. But it does more than that.

This is believed to be the first study of the frequency of speech sounds in oral English, the scientists believe. Written matter has been analyzed before and the results of these past researches supply interesting material for comparison with the study of oral speech. There is also another reason for the research. By finding what sounds are repeated most frequently, telephone engineers may work toward improving their transmission.

Observations were made on typical toll conversations in New York City. During one week the person listening-in recorded verbs only, the next week nothing but nouns and the third week adjectives and adverbs only. Data was taken on 500 conversations each week.

Thus the information gathered from many conversations was equivalent to complete data on 500 "average" calls. The thousand people taking part in these average calls used 80,000 words, only 3 per cent. of which were different words.

Apparently, over the telephone people talk about themselves more than about any other subject, for more than 7,500 of the 80,000 words were the pronouns "I" and "you." In fact, 121 different words which constitute the minor parts of speech form more than half, 45,000, of the total occurrences.

As might be expected, telephone conversation is made up of more smaller words than the written English previously studied. In conversation, the 155 most frequently used words make up 80 per cent. of the total occurrences, while to reach the same percentage in written English, 640 words must be included.

Strangely, more words of Latin origin are used in conversation than in writing. Of the 100 most frequently used words of conversation, 11 are of Latin origin as compared with only two from the first 100 written English. Twelve active verbs such as "get," "see" and "know" occur among the 50 most used words of conversation, yet are entirely absent from the first 50 words of written English.

More than four fifths of the conversation words were naturally monosyllables, largely a result of the frequent repetition of the minor parts of speech, of which 95 per cent. are monosyllables.

Of the telephone calls observed, 86.5 per cent. were between two men and only 10.4 per cent. between two women. As the observations were made at random, apparently men make more toll calls in New York than women. It would be interesting to repeat the study with observations on more women's calls than on calls of men.

ITEMS

STATISTICIANS of the Metropolitan Life Insurance Company report that in spite of influenza and unemployment which always boost it, the tuberculosis death rate is six per cent. less for the first half of 1931 than the record low point reached last year. Diphtheria dropped 35 per cent. in fatality. Whooping cough was a little less fatal, but deaths from scarlet fever and measles increased. The year 1931 so far has had more influenza and pneumonia, and the rise in the cancer death rate has been particularly disturbing. The diabetes death rate is up, also heart disease and cerebral hemorrhage. Violent deaths from suicide, homicide and automobile accidents increased, but violent deaths from all accidents alone are less.

AN obstinate case of eczema was traced by a Hungarian physician, Dr. Stephen Rothman, to handling too much metal money. A communication to the American Medical Association tells how he found the cause of the disease. The patient counted silver, nickel and copper coins for the Budapest street car company all day, and had eczema on his hands, underarms, shoulders and neck. Tests with clean and sterile coins on the skin brought about swellings and inflammations and the salts of these metals proved still more irritating. But another healthy person was not at all affected by these.

WIDE introduction of four-wheel brakes and tremendous increase in commercial transportation by automobile has rendered obsolete the national safety code for braking systems. Under a new code, being prepared under the auspices of the American Standards Association, all types of brake and brake-testing systems for both commercial and passenger vehicles will be covered; at present only two-wheel brakes on passenger cars are dealt with. More than thirty national organizations, including automobile manufacturers, associations and technical bodies, will cooperate in drawing up the new code.

A NEW type of stone-bladed tools that were used by Stone Age men and women thousands of years ago has been discovered in South Africa and reported to the Royal Society of South Africa. Mr. C. Van Riet Lowe, who announced the discovery, stated that the stone implements were found during exploration at Mazeppa Bay, near the mouth of the Kogha River. The implements are numerous and are said to be of a kind hitherto unrecorded in scientific data. It appears that they represent a distinct stage in Stone Age industry. Some of the implements are long, blade-like shapes. Some are scrapers, gravers and points, but the most characteristic specimen is like a giant crescent.

THE first known specimen of a cross between a moose and an elk was recently killed in the Deerlodge National Forest, in Bear Gulch. The animal, known to United States forest rangers as "the elk with the funny horns," associated with elk and grazed like them, but had a body and horns that were half moose and half elk. He was first seen on the Boulder Creek District of the Deerlodge Forest when about three years old, judging from his appearance. When killed, the animal weighed 1,100 pounds.