

superstructure. Much larger vessels than the America have been built in the United States but they are all warships.

A special acoustical ceiling in the freight holds will prevent the irritating noise of cargo handling from bothering passengers aboard the vessel while in port. The America, which will not be a fast vessel, since it will require about seven days to make the Atlantic crossing, has a flush-riveted hull below the water-

line to cut resistance to its passage and reduce wasted horsepower.

A sample stateroom, designed by Gibbs and Cox, the ship's designers retained by the United States Lines which will operate the America, was built while the vessel was still on the ways. It has helped in working out the basic plan of passenger accommodations. There will be about 400 staterooms altogether. Passenger capacity is to be 1219.

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GENERAL SCIENCE

Air Disarmament Today Would Not Hit Peacetime Plane Use

British Air Ministry's Research Director Says Previous Obstacle Has Been Eliminated by Progress

War stopped the B. A. A. S. meeting at Dundee after three days of sessions. All papers were made public as though actually read.

EFFECTIVE air disarmament is possible today without interfering with the peacetime development or use of the airplane, the British Air Ministry's research director told scientists meeting in Dundee, Scotland.

A previous technical stumbling block to abolition of the bomber has been eliminated by the last ten years of aviation progress, H. E. Wimperis said before the British Association for the Advancement of Science.

Ten years ago military and civil planes were so nearly alike, commercial craft could be easily converted into bombers so that any international limitation of bombers alone meant little.

Now, however, he asserted, as England wrestled with a diplomatic crisis which may end in air raids over her chief cities, commercial planes are so much slower than military ships that the commercial planes cannot be used in war. A limit on bombers alone, therefore, could be made to stick.

"The speeds of military aircraft are now in excess of 400 miles an hour and will rise still higher. But civil aircraft rarely go faster than 250, and it is doubtful whether it is economically advantageous to have even so high a speed as that," Mr. Wimperis, who is president of the association's engineering section and is a former president of the Royal Aeronautical Society, pointed out.

"Again, the comfort and space needed

for civil transport tends to produce a design of body which does not in the least resemble military requirements."

Only bombers need to be limited or abolished, he continued. Fighters are useless as bombers. "It cannot worry any peace-loving country, if one of its neighbors builds 1,000 or 10,000 interceptor fighters, any more than it would if that neighbor built immense numbers of anti-aircraft guns and searchlights.

"It would be but cautious to agree on a limit to the speed of civil types, but as this would merely confirm what economic requirements would themselves suggest, it need be no hardship."

Tomorrow's largest airplane, very likely a flying boat, will weigh about 250 tons as compared with today's biggest, the 41-ton Boeing-type Atlantic Clippers, Mr. Wimperis predicted. It will be powered with a dozen 3,000 horsepower engines. The largest power plant now in existence is an American 24-cylinder engine of about 2,400 horsepower.

Shells Aid Airplane Study

SCREAMING shells from field artillery are to be photographed as they tear through the air as an aid in research that will produce the super-speed bombing and fighting planes of the future, according to plans announced by Dr. J. W. MacColl of the British Ordnance Commission, with headquarters at Woolwich Arsenal.

The photographs of course cannot be made under ordinary field conditions. They will be "posed" pictures, with the

shells fired across the field of focus of fixed cameras, on the artillery proving grounds.

Not that anybody expects future planes to travel as fast as artillery projectiles. Speeds more than about twice the highest now attainable with special racing planes impose such stresses that no practical way is even remotely in sight, of building aircraft parts that could stand up to them.

The contribution of flying shells to flying machines is expected to be a better scientific understanding of how air resistance against various shapes of "nose" builds up those stresses. At present velocities, such studies are made in wind tunnels, in which extremely high-speed currents of air are blown against stationary models. But a shell can serve as an extremely high-speed model, hurtling through the stationary air.

May Near Sound's Speed

FLIGHT approaching the velocity of sound, which is about 725 miles an hour, is a possibility, though its actual attainment will be difficult and exceedingly expensive in terms of engine power, C. N. H. Lock of the National Physical Laboratory at Teddington, near London, told fellow-physicists at the meeting.

In the Teddington laboratories, air speeds nine-tenths the velocity of sound, or about 1,000 feet a second, have been achieved in a small wind tunnel only a foot in diameter. A second, somewhat larger tunnel is now under construction. It will have glass windows in the side, so that the behavior of wing models under this high wind speed can be photographically recorded.

Grass Important Food

WITH war a reality, food will figure as importantly as munitions, and there will be a corresponding temptation to plow up Britain's long-established grasslands to plant grain and other "quick" food crops. How to keep the protecting grass and yet get fullest food value out of it, via milk and meat, was discussed in a special session of the B. A. A. S.

A new method of handling grass, that has been gaining favor in Britain, is to cut it at a younger stage than is customary for hay and dry it rapidly with artificial heat. The physiological and economic advantages of this method were set forth by Dr. S. J. Watson of the Jealott Hill Agricultural Research Sta-

tion in Berkshire and by E. J. Roberts of the University of North Wales.

As contrasted with ordinary hay, dried grass keeps a higher protein content and preserves far more of the important coloring-matter carotene, which is converted into growth-promoting vitamin A in the bodies of animals.

Questions "Racial" Limits

SORTING truth from falsehood in nations' claims that their boundaries should coincide with the boundaries of their constituent "races" is a prime duty of those scientists who make a special study of man as a physical being, urged Prof. W. E. Le Gros Clark of Oxford University, president of the B. A. A. S. section on anthropology.

Most anthropologists will agree, he said, that nations of the political world today are a fusion of races kept together, not because of blood relationship, but because of common language, customs, traditions and education.

Advising anthropologists to come out of the "museum stage" of their work, Prof. Clark predicted that the science of man will in future deal less with fossil bones of man's prehistoric ancestors and more with social problems facing the world right now. Emphasizing the lack of evidence which would show conclusively the role of physique and racial type in such important matters as undernourishment, susceptibility to infections, tendencies toward crime, Prof. Clark declared that "it is remarkable that we still lack this essential knowledge."

Would Teach Sign Language

IN CONTRAST to present separatist-nationalistic trends in Europe a proposal was advanced that every child in every country should be taught in play to "talk" the same sign language. This would provide a universal language to enable people of different languages to communicate, declared the sponsor of the plan, Sir Richard Paget, Bart.

Sir Richard, noted for his investigations as to the origin of human speech, described the systematic sign language which he and associates have devised. Denouncing the sign language used in church services for the deaf as "unsystematic and difficult for normal people to learn," Sir Richard said that the new sign language can be easily learned by the parents and family of a deaf child. By approaching the problem of language with these signs, he explained, "the mind of the deaf child would develop nor-

mally and he could then readily be taught to read and speak."

Alcohol Replaces Morphine

ALCOHOL injected into the sheaths of nerves that convey sensations of intense pain in advanced cancer cases does the work hitherto monopolized by morphine but without the latter drug's bad after-effects, it was reported by Dr. T. F. Todd of Salford Royal Hospital.

The treatment is risky to use, Dr. Todd cautioned. An overdose of alcohol may injure the nerves severely, scar their roots and lead to paralysis. "In view of these effects the method should be restricted to hopeless cases such as patients suffering from cancer." In his own practice, Dr. Todd has used alcohol injections mainly for the relief of patients in advanced stages of uterine cancer. Usually full relief from pain, lasting for three or four months, has been obtained.

Peaceful World Pictured

AN IDYLIC, warless world, a world without battles because there were no men in it to fight them, was depicted by the British Association president, Sir Albert C. Seward, F. R. S., emeritus professor of botany at Cambridge University.

Forgetting for an hour the menace that lay behind the rolling clouds over the North Sea, his audience heard him tell of a quiet landscape of strange beauty, that stretched from what is now Scotland to the coast of Alaska, almost halfway around the circumpolar world. Known to geologists as the Continent of Thule, it bore a population of trees and lesser plants whose nearest living relatives are found in China and Japan, California and the eastern United States.

A key to the botany of Thule was discovered in fossil beds on the Isle of Mull, off the western coast of Scotland. The rocks of Mull were formed in part by a series of great lava flows, with long periods of quiet in between. In the quiet intervals, soil formed on the lava surfaces and forests grew up in the soil. In them were such trees as plane or sycamore, magnolia, sequoia, ginkgo and the cryptomeria, famous in Japanese temple grounds.

"Lebensraum" Fanciful

GERMANY'S "Lebensraum" (room for living) claims were termed "fanciful." The speaker, A. Stevens, lec-

turer in geography at the University of Glasgow, denied the urgency of any problem of more living-space for the Reich, pointing out that while parts of Germany are as densely populated as Great Britain, there are still stretches of territory offering sufficient elbow-room, especially in the more recently settled eastern portions of the empire.

The question becomes one of national psychology, or at least of ruler-psychology, Mr. Stevens indicated: "Germany is sensitive to, if not conscious of, the disproportion between the power to organize and rule and the space to be organized and kept in order . . . She could not contemplate the possibility of herself having lost the United States as we did. Were her colonies not 'stolen' at Versailles, while her acquisitions from Denmark and Poland were legitimate conquests? . . . The tenacity with which a view is held is often in direct proportion to its absurdity."

Germany has been led into her fatal career of conquest partly through her combination of technological skill and financiering, Mr. Stevens pointed out: "There is a part of Germany called the Bay of Leipzig, once a region of corn and beer, now the land of lignite. Here coal tar is abundant and electricity is cheap. Self-sufficiency is a means of security, and self-sufficiency calls for the substitute, the Ersatz.

"We may indicate the function of this region in modern Germany by dubbing it Ersatia. The Ruhr is threatened by the French, Upper Silesia by Poland, and both are conveniently marginal. Does Germany see in Ersatia the heart whose beating must be her life in any future struggle? . . . There is money in Ersatz, especially in war: the industrialists are interested: the step is practical politics."

In the course of his address on natural geographical regions, Mr. Stevens contrasted the politico-military difficulties that have resulted from their development along jarring nationalistic lines in Europe with the freedom from friction that obtains within the wide boundaries of the United States.

"The proper scale of organization," he said, "is no longer represented by the European nation-states but rather by the United States."

Civilization in Africa

AFRICA, like Europe and Asia, has through the ages been the scene of ebb and flow of peoples, and the rise and fall of cultures, Prof. Raymond A. Dart of Witwatersrand (*Turn to page 172*)

ENGINEERING

Henry Ford Gets Patent For Improved Type Of "Liners"

New Inner Surfaces for Motor Cylinders Can Be Removed With a Screw Driver; Of Thinner Stock

HENRY FORD has been granted a patent (No. 2,170,015) by the U. S. Patent Office for an improved easily removable "liner" for automobile cylinders. Liners are the hardened inner surfaces of cylinders in which the pistons move and which serve to conduct the excess heat of the explosion of fuel to the engine block.

The new Ford liners can be removed with a screw-driver, in contrast to the powerful presses formerly employed to free them from the engine block. They are also made of thinner stock and thus have better heat conductivity, states the patent.

Liners in the past, Mr. Ford indicates, have been made of special steel tubing either pressed or screwed into the cylinder bore. The latter method is most expensive and but little used in medium priced motor cars.

Inserting a tubular liner has been accomplished by "freezing" it to the temperature of liquid air (thus making it contract) and then placing it in the cylinder bore where it expanded to give a tight fit.

Getting the lining out for replacement was something else, however, and powerful presses have been employed. Even then the lining was apt to break, jam within the cylinder and score it.

Ford's new linings are made of flat thin sheet steel of 20 to 22 gauge curved into a cylindrical shape. Beveled edges on the ends of the sheet meet to form a groove. Spot welding of this groove is made at three points, near each end and in the middle.

The embryo liners are then heat treated, made to absorb considerable amounts of carbon on their surface which—on cooling—gives a hardened surface comparable with that of expensive alloy steels.

The liners are next placed in the cylinder bore by the chilling, liquid air method. The trick of getting them out is accomplished by merely putting a small screw-driver down the groove and breaking the tiny weld. Next the middle weld is ruptured and finally the third.

Then you reach in and lift out the liner.

Cheap replacement for what has previously been a costly difficult operation is one claim of the patent. Others are less costly initial materials and better heat conductivity of the finished liners.

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University told anthropologists attending the meeting. Ruins at Mapungubwe in South Africa, he said, show that a high culture existed in this part of the world in late Stone Age times, before the coming of the Bantu-speaking Negroes who now dominate most of the continent.

Skeletons associated with the Mapungubwe finds indicate that this ancient civilization was the work of a race intermediate between (and possibly a hybrid of) the Crô-Magnon and Neanderthal types, which are quite distinct in Europe.

An effort to unscramble the puzzling near-human ape remains found in South Africa was made by Dr. Robert Broom of the Transvaal Museum, Pretoria. Perhaps the best known of these are the Australopithecus skulls, which are quite definitely ape-like, except that their teeth are much more like those of man than they are like the teeth of gorilla or chimpanzee. Dr. Broom regards Australopithecus not as ancestral to man (he came too late in time for that) but as a survivor of a possible ape-like ancestral stock that existed before Ice Age times.

Moroccan Doctors' Secrets

EXHIBITING to the anthropologists 65 native Moroccan charms and sickness remedies, Walter Fogg of the University of Wales told of overcoming Moslem doctors' aversion to revealing their secrets, and reported that the majority of the 65 items deal definitely with witchcraft and evil spirits. Prescriptions in Morocco include wearing a piece of camel's windpipe for hiccups, and wearing the body of a holy bird, the hoopoe, as "a charm against almost anything."

Even British botanical laboratories at Kew have been unable to determine all plant ingredients in some of the mixtures, Mr. Fogg reported. Some of the remedies come from ancient Egyptians and Greeks.

Life Largely Surfaces

SKIN-DEEP is not merely beauty, but life itself, it was suggested in the address of Prof. Eric K. Rideal, of Cambridge University, president of the B. A. A. S. chemical section. The thinnest of skins hold the secret of life—layers only one molecule deep, at the interfaces where two cell-constituents meet, for example, a fatty substance in contact with a watery solution.

The very shape and arrangement of the molecules in these thin layers are of vital importance, Prof. Rideal explained. The larger molecules, especially those of the proteins, are long affairs, with definite "head" and "tail" ends, bearing opposite electrical charges. Their arrangement in the surface films determines the way in which they absorb food substances, resist or succumb to poisons, permit wastes to leave the cell, etc.

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ASTRONOMY

Omicron Andromedae Varies More Than Half Magnitude

LAATEST fickleness in the heavens: The relatively bright star, Omicron Andromedae, visible with naked eye, varies more than half a magnitude from its third magnitude brilliance. Evidence found by Dr. Richard M. Emberson in observations made with a thermoelectric photometer attached to a Harvard telescope at Oak Ridge, Mass. Astronomers will conduct an investigation into the cause of this new-found variability. The larger the figure for the magnitude of a star the fainter the star. Stars more than sixth magnitude are invisible to the unaided eye; often it is hard to see the fifth and sixth magnitudes.

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● RADIO ●

Dr. F. Alton Wade, geologist and senior field scientist of the U. S. Antarctic expedition, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, September 18, 4:30 p.m., EDST, 3:30 EST, 2:30 CST, 1:30 MST, 12:30 PST. Listen in on your local station. Listen in each Monday.