that are found in wood. In discussing the lignans Prof. R. D. Haworth (University of Sheffield) pointed out that the basic structure common to all lignans comprises two phenylpropane units linked in the β-positions. The structure and stereochemistry of some of the naturally occurring lignans, of which about forty are known, was considered. Where ring closure has occurred, with formation of phenyltetralin or furano-structures, the creation of a new asymmetric carbon atom renders the stereochemistry complex. There is evidence that the lignan structure can be formed by oxidation of αβ-unsaturated phenylpropane compounds, such as ferulic acid.

A survey of the discovery and determination of structure of the tropolones found in various woods was given by Prof. J. Gripenberg (Institute of Technology, Helsinki, Finland). The distribution of the tropolones, which appear to be confined to the family Cupressaceae, was discussed and their general properties and synthesis described. It is interesting to note that all the nine known tropolones occurring in wood contain an isopropyl (or isopropenyl) group and appear to be closely related to the terpenes. A scheme by which they may be derived from carone has been proposed by Erdtman.

Dr. D. E. Hathway (British Leather Manufacturers' Research Association) discussed the occurrence of stilbenes in wood and referred to the recorded incidence of hydroxystilbenes in conifers and dicotyledonous trees. In a study of the extractives of the heartwood of *Eucalyptus wandoo*, 3:5:4′-trihydroxystilbene and its 3-glucoside were found to be present, and these compounds have been used as tracer substances in an investigation of the heartwoods of 60 species belonging to the *Longiores* sub-section of the genus *Eucalyptus*. This method confirms the existence of certain anomalies in the classification that have been suspected on other grounds.

The fourth paper in this group, dealing with the flavonoids, was prepared by Dr. R. A. Laidlaw and Dr. J. W. W. Morgan (Forest Products Research Laboratory). After a short account of the occurrence, function and nature of the flavonoids of wood, Dr. Laidlaw went on to consider three classes of these compounds, namely the leucoanthocyanidins, dihydroflavonols and benzylcoumaranones, in greater detail. Methods for determination of the structure and stereochemistry of the leucoanthocyanidins and their characterization as flavan-3:4-diols were discussed. Among the dihydroflavonols, dihydromorin, phellamuretin and keyakinol were selected for special mention. The naturally occurring aurones and hydroxybenzylcoumaranones were described and the behaviour of maesopsin (tetrahydroxybenzylcoumaran-3-one) on heating with alkali was discussed in detail.

The final section of the symposium consisted of two papers in which different aspects of the utilization of wood were considered. Dr. R. H. Farmer (Forest Products Research Laboratory) discussed the influence of extractives present in different timbers on some of their technically important properties and applications. A brief account was given of the manner in which the colours of woods (and the changes in colour occurring under certain conditions) and their natural durability are related to the chemical nature of the extractives present in them. Examples were then given of interaction between wood components and other materials with which the wood comes into contact. These include the inhibition of the hardening of unsaturated polyester resins by certain timbers, shown to be due generally to quinones or hydroxystilbenes, and the retardation of setting of cement by water-soluble sugars and tannins.

In the final paper Prof. B. Lindberg (Swedish Forest Products Research Laboratory) described the influence of extractives on the pulping of timber. Extractives can influence the sulphite or the alkaline pulping processes in various ways. Thus they may render the penetration of the cooking liquor into the wood more difficult, react with the cooking liquors and modify them, or condense with the lignin, preventing its dissolution. Resinous and fatty components may give rise to 'pitch troubles', and can cause difficulty in bleaching because chlorination renders them more lipophilic. R. H. Farmer

THE INTERNATIONAL SCIENTIFIC FILM ASSOCIATION

FIFTEENTH CONGRESS

THE fifteenth annual congress of the International Scientific Film Association was held at Rabat, Morocco, during September 14–20, 1961. This was the first time that the Association had met outside Europe. The congress was under the patronage of H.R.H. Prince Moulay Abdullah.

Of the Association's twenty-five member countries, sixteen sent delegates and there were also observers from Guinea, India, Indonesia, the Lebanon and Mali. The largest delegation of twenty-two people was from Great Britain, followed by the U.S.S.R. with about twenty.

All delegates, observers and friends enjoyed the gracious Moroccan hospitality. From Rabat, where all were well housed in the new Cité Universitaire, excursions were made to Casablanca, Fes, Meknes and Marrakech. As the sun shone without hesitation throughout each day on every day, expeditions were also organized to the delightful beach at Temarah.

In his address of welcome, M. Moulay Ahmed Alaoui, Minister of Information, Fine Arts and Tourism, expressed his country's pleasure at the honour being paid to Morocco as the scene of the congress. This indicated also the importance of the African continent in the building up of the modern world. For countries like Morocco, the cinema was not a diversion, but an important instrument in education and instruction.

This congress has always two aspects: one organizational, the other concerned with the problems of scientific film makers. The former provides the machinery whereby the film makers can get together and see and discuss films in three main sections: research, education and popular science. For some time there has been a feeling that the organization has needed tightening, and this congress took certain steps to do so. The new president is Mr. Edgar Anstey (Great Britain), who replaces Mr. Alexandre

Zgouridi (U.S.S.R.). The new honorary secretary is M. Mohammed Afifi (Morocco), who replaces Mr. John Maddison (Great Britain). It is Mr. Maddison's guiding hand in the main which has been responsible for the steady development in the influence and prestige of the Association. He has now been elected an honorary life member.

The thirty films shown to the Research Section were described by its president, Dr. R. Robineaux (France), as on a very high level. Five films from France, two from Western Germany, and one each from Italy, the Netherlands and Czechoslovakia were specially selected by the Section for commendation. At the discussions the special theme was new techniques. The French described some new tools to aid research. These included:

(1) The light helper (this is a free translation of *l'asservisseur de lumière*), an instrument which allows the time of placing of the camera on the desired part of the curve of spectral sensitivity of the film to be fixed exactly and automatically, without acting on the diaphragm and without having to worry about rectifying the time of placing during the forward movement of panning of the camera. It can be used in particular for taking shots automatically and slowly during daylight ; for example, during the complete phase of a solar eclipse when there are enormous differences in light. The instrument is a kind of 'cybernetic' tool.

(2) The *brillancemètre*, which is incorporated in the camera to allow of instantaneous control of the mean brilliance of the image.

(3) Motor regulated by transistor, a motor with continuous current fed by 8-, 12- or 24-V. batteries, with transistorized regulation between 8 and 40 images a second, to which a small frequency emitter can be added to record sound on a separate magnetic tape at 24 or 25 images a second, even with differences in tension of several volts in the batteries.

There was also a description of an apparatus to take under-water pictures with automatic illumination with synchronized flash. It was developed primarily with biologists in mind, but has been of interest also to industrialists for the study of corrosion of submerged mechanical parts, and for the study of currents and their effects on public works and harbour installations.

Dr. G. Wolf, director of the Institut für den Wissenshaftlichen Film, Göttingen, described how the film was being used for research in agriculture. Evenly distributed rye was fed over an endless belt into the bar drum of a threshing machine. In it the stresses to which the grain was subjected were observed and gauged. With a circumference speed of the drum of 30 m./sec., the grain moves about two-thirds more slowly. The flow of the threshed grain follows with irregular density due to congestion in the entrance. An analysis was made of exactly what happens in the different parts of the threshing cage and productivity was increased. Similar film analysis was done on the cutting capacity and cutting quality of the lawn-mower and hedge-cutting machine, which have developed empirically.

Mr. L. Hallett and Mr. John Maddison, both of Great Britain, read a paper on the "Use of Time Lapse in Research".

Thirty-eight films were exhibited for the Education Section. Unfortunately, as the president, Prof. J. Jacoby (Poland), stated, there were no films from Great Britain or the U.S.S.R.: these had been sent but had been mislaid. Prof. Jacoby was highly critical of the films seen. He thought the quality was lower than that he had seen at any congress. However, special mention was made of the films from Eastern Germany, which were commended for the high overall quality of their entry.

Prof. Jacoby said that screening conditions had made it impossible to appreciate the full technical quality of 16-mm. films. He wanted national branches of the International Scientific Film Association to take special care about the selection of films in future.

Seventy-two films were shown to the Popular Science Section. These were also of uneven quality and, as the president, Mr. V. Tosi (Italy), said, there was a great need for a clearer statement of the role and nature of the popular science film.

Running at the same time as the congress, was a festival of popular science films which were shown nightly and were open to the public. These films were included in the viewing by a special jury set up to recommend the outstanding popular science films of the congress. The following films were selected: Great Britain, "Electron Microscopy", made by A.E.I.; Eastern Germany, "Robert Koch"; Bulgaria, "Life in a Drop of Water"; Czechoslovakia, "Secrets of Heredity"; Hungary, "Silver Threads"; France, "Thaumetopoea"; Rumania, "Coke"; U.S.S.R., "Colour TV"; Poland, "The Gulf of Polar Bears". The British film, "Wild Highlands", made by the British Transport Commission, was mentioned for the high quality of its production and two Japanese films, "Lubricating Oil" and "Ancylostoma" were commended for their high technical quality. The Moroccan Scientific Film Association, as host country, awarded a diploma to the Japanese for their entries as best fulfilling the aims of the Association.

There was a special session on television, at which the main speaker was Mr. Aubrey Singer (Great Britain), of the B.B.C. During the past year, a commission for the study of problems of the use of television has been working. Its secretary, Mr. Jean Le Harivel (Great Britain), presented a detailed report based on information received from eight countries.

Most countries have some kind of science programme which goes out generally in the evening and is intended for large audiences of adults. Several countries produce science programmes for schools. A few countries have used television for the education of adults. This is true of Eastern Germany, with its television academy (mathematics and chemistry); of Czechoslovakia; of France, which has started technical education programmes and which is planning a series for workers on the social significance of technological developments; and of the United Kingdom, which is planning for 1962–63 a series of topical education programmes to supplement existing technical courses. In the United States, "Continental Classroom" is a television programme for the teaching of teachers. It goes out at 6.30 a.m. to a weekly audience of 1,700,000 through 150 stations.

Mr. Jan Varossieau (Netherlands) of the Stichting Film en Wetenschap Universitaire Film Institute, described the use of closed-circuit television for the teaching of science in the universities. A van had been fitted out to tour the country. It carried a Philips compact 'Vidicon' transistor camera. This could be linked to monitors in the lecture hall.

The congress agreed that closer co-operation between film and television producers would be of mutual benefit, and that there was a great need for centralized information services.

Information was given of the detailed plan prepared by the Association for Unesco to facilitate the distribution of films to universities. The purpose is to prepare a select list of films which could be used in first- or second-year university courses and of which it is possible to supply copies. This is an experimental project and the number of subjects to be covered and the number of films to be selected is limited. In co-operation with the International Council of Scientific Unions, a list of subjects has been prepared, reported Mr. B. Chibnall (Great Britain) the director of the project. The list includes subjects in botany, zoology, geology, chemistry and physics.

The International Film Library has been set up in Brussels, during the past year. It is having some initial troubles, but the Belgian Government has given a generous grant and premises. Among the directors are Mr. Edgar Anstey and Mr. John Maddison (both of Great Britain).

Among other decisions taken at the congress were to investigate the possibility of compiling and having published an international multilingual standard reference journal and vocabulary of scientific cinematography, and to standardize film catalogues. An offer by the Moroccan Government to investigate the possibility of setting up a distribution centre in Africa for scientific films was accepted. Two newly elected member countries of the Association are the United States and North Korea. This brings the total of member countries to twenty-seven, with three corresponding member countries.

The new officers of the Association are as follows: *President*, Edgar Anstey (Great Britain); *Vice-presidents*, J. Jacoby (Poland), S. Okada (Japan), R. Whaley (U.S.A.), A. Zgouridi (U.S.S.R.); *Hon. Secretary*, Mohammed Afifi (Morocco); *Hon. Treasurer*, Vladimir Vaclavek (Czechoslovakia).

The editor of *Scientific Film*, the official organ of the Association, is Mr. Maurice Goldsmith, c/o The Scientific Film Association, 55*a* Welbeck Street, London, W.1. The 1962 congress is to be held in Warsaw, and the 1963 congress in Rome. M. Goldsmith

EDUCATION IN EMERGENT COUNTRIES

Formerly an outstanding educational administrator in New Zealand and now his country's Ambassador to France and permanent delegate to Unesco, Dr. C. E. Beeby presented an interesting paper on September 5 to Section L (Education) of the British Association for the Advancement of Science meeting at Norwich. The paper was based on Dr. Beeby's experience with the growth of educational services in newly developing countries, and especially Western Samoa, but also drew from his wide acquaintance with the evolution of educational systems in Western countries.

Dr. Beeby showed that, while it has taken England a hundred years to work out a system of universal primary education fairly well adapted to the needs of the community and to the varied capacities of the children in schools, a number of emergent countries is now trying to do the same thing in a decade. At first sight it might appear that, with Western aid and benefiting from Western experience, they could leap the century and establish straight away something approaching a good modern type of classroom without having to plod through the stage of dreary formalism that marked the first fifty years of the Western system of compulsory schooling.

The position is not as simple as this, and the 'expert' advising an emergent country on its primary school system finds himself in the position of a butterfly teaching the chrysalis how to fly. There is an intermediate stage which must be gone through before some of his advice is of much significance. Dr. Beeby became aware of this sixteen years ago when he had some responsibility for the control of two education systems that were, at that time, at least half a century apart. He found himself, without any sense of inconsistency, encouraging in Western Samoa the introduction of the formal educational practices which he had for a long time been combating in New Zealand. This led to the conception of stages of development in the life-history of an education system, stages through which all systems, at least of a certain type, must pass, and which, though they may be shortened, cannot be skipped.

The inability of a primitive type of school system to profit immediately from all that has been learned about modern teaching methods is in no way due to any innate inferiority of either children or teachers in emergent countries. It depends primarily on two professional factors—the level of general education of the teachers in the system, and the amount and kind of professional training they have received. On this basis the development of an education system could be roughly divided into three stages: (1) 'dame school' stage, where teachers are ill-educated and untrained; (2) stage of formalism, where they are ill-educated but trained; (3) stage of meaning, where they are relatively well educated and also trained. At the dame school stage the syllabus consists of little but mechanical drill on the three R's and the memorizing of relatively meaningless symbols. The unsophisticated and untrained teacher turns naturally to formal methods of teaching, and the real weakness of the teaching at the dame school stage is that it is confusedly and inefficiently formal. It has all the defects of formalism and none of its virtues; it is formalistic in spirit without having form.

At the other end of the scale the main characteristics of modern education, in spite of its failings, are the attempt to give the child a deeper and wider understanding of the meaning of the symbols with which he works. Practice in a good modern school is free, informal, and apparently 'natural'; but it is based on a complex and sophisticated structure of theory, and, to succeed, it demands teachers who are both well-educated and well-trained. This is a long step from the ill-educated and untrained teacher at the dame school stage, and in between must inevitably come the stage of formalism where teachers are still ill-educated but are trained. For sheer formlessness the only remedy is more form, however much one may dislike formalism as such in education.

The freedom and informality of the modern classroom depend on the teacher being sure of himself and of his subject-matter, and a teacher who is teaching at the very limits of his knowledge can have no sense of security if he or his class wander beyond the bounds of a tight official syllabus or the paste-