institute graduated one Ph.D. In 1963 Case awarded 53 degrees; the target for 1970 is 100 or more. In 1947, also, 65 percent of Case students came from Cuyahoga County, whose county seat is Cleveland, and most of the rest came from other parts of Ohio. This year only 16 percent hailed from Cuyahoga County and 51 percent were from outside Ohio.

In 7 years the percentage of graduate students at Case has risen from 6 to about 40 percent of the total enrollment of nearly 2500. Some 375 graduate students, however, are part-timers, a pattern which is an old one at Case, but which is changing. With both undergraduates and full-time graduate students, Case now claims a level of selectivity comparable to that of the nation's top engineering schools.

The Case curriculum and academic organization have undergone the changes which have grown familiar on the better engineering campuses.

Much more emphasis is being put on research, and a bigger faculty devotes more of its time to research. The undergraduate curriculum shows a shift away from stress on early specialization and courses in applied technology and toward basic sciences. Humanities and social sciences figure larger in the undergraduate program. Case's departments of civil, mechanical, electrical, and chemical engineering have been merged into an engineering division, and Case's embrace of the trend toward interdisciplinary programs is reflected in the establishment of centers for computing, materials, engineering design, and systems research.

One of the latest and most novel examples of Case-Western Reserve collaboration is a new joint program in philosophy. The aim will be to apply philosophical analysis to the logic and methods of science and technology, art, law, politics, and moral behavior. A center for teaching, graduate study, and research in philosophy is to be established, with permanent and visiting faculty, recruited to include not only philosophers but experts in other fields. A Carnegie Corporation grant of a quarter of a million dollars for the formative years of the program should help accomplish the joint founders' aim of attracting "the best people." The new program is alluded to often at Case and Reserve as a hopeful model of what can be done through cooperation.

That increasing collaboration between Case and Reserve means eventual merger seems at this time at least doubtful. The University Circle institutions seem to be working toward something like a loose federation rather than a fully centralized system. While acknowledging the value of overall planning, Circle officials seem to agree on the value of institutions maintaining separate identities and separate administrations sensitive to the needs of each institution.

More serious problems are raised by the relations of the University Circle to the city and, particularly, the area immediately around the Circle. Cleveland is split into east and west sections by the Cuyahoga River, which flows north into Lake Erie. On the east side are older residential areas, some of them rundown, some not, and a large proportion of Cleveland's Negro popuation. East of the city lie wealthy suburbs. On the west side are concentrated middle- and lower-income white neighborhoods.

Lying virtually on the city boundary, the University Circle is backed by a bluff, where Cleveland Heights, the first of the suburbs, begins. On the city sides of the Circle are older neighborhoods including Cleveland's "little Italy" and the Hough area, where there has been some racial trouble.

The University Circle Development Foundation has a 20-year plan which is designed not to wall off the Circle from its surroundings but, rather, to serve as a kind of good-neighbor policy to help reverse the progress of urban blight in areas where it has set in. The foundation on occasion has offended its neighbors by some of its moves and some of its plans for expansion through the use of urban renewal projects, but the atmosphere so far seems to be less tense than in similar situations in some other cities.

In store for the educational institutions in the Circle is the new challenge of public higher education in Cleveland. A 2-year community college financed by the county is already in operation, and establishment of a university in the Cleveland area in the near future is highly likely (*Science*, 17 July, p. 253). The private institutions of higher education in Cleveland—there are a dozen, including Case and Reserve—therefore, face a new era of competition so far as local students are concerned.

But at Case and Reserve, despite those local factors, there seem to be fairly strong feelings on the part of faculty and administration that momentum has been established, that the flow of federal funds into research is not likely to be turned off, and that, as part of the University Circle complex, they are in the right place at the right time.—JOHN WALSH

Negro Colleges: Long Ignored, Southern Schools Now Courted by Major Universities and Foundations

America's Negro colleges, long shunned as the ugly ducklings of this country's system of higher education, are now being courted as if their transformation into swans were expected momentarily. The Negro colleges are benefiting not only from pressures that can specifically be called "civil rights" but from the increased attention being given the problems of the "culturally deprived" in general, and from the accumulated wisdom and expertise of the educational reformers who have been active since Sputnik. The debate on whether Negro institutions should ultimately disappear continues, but it has been quieted by the realization that for the present the country ought to develop all the educational resources it can muster, and that the Negro colleges reach a socially increasingly important segment of the population. The programs being developed to aid the Negro colleges vary in motivation as well as in objective, but behind all of them lies the fact that, for the first time, a community of interest has been recognized between the leaders in American education and the institutions that were so far behind that even "following" had become impossible.

The only adequate generalization one can make about the 116 Negro colleges is that they are uniformly worse off than their white counterparts. Several of the larger institutions—Howard University in Washington, D.C., Hampton Institute in Hampton, Virginia, Fisk University in Nashville, Tennessee, and a few others—have not fared badly in attracting the most talented of the Negro high school graduates or in building up, with the aid of the comparatively affluent alumni and donors, comparatively well prepared faculties. These universities are recognizably members of the same species as other U.S. universities, and they are giving as much as they are receiving in the current atmosphere. But the fact that many of the talented faculty members and administrators of these schools are nearly exhausted from the demands now being made on their experience,

knowledge, and advice underscores the gross inadequacies of the system from which they came, as much as it highlights the relative successes achieved by a few.

With the exception of a handful of institutions in Ohio and Pennsylvania, all the Negro colleges are in the South. Of the 116, only 76 are accredited; many of these are accredited only conditionally.

The core of the accredited colleges, according to the American Council on Education, consists of two groups—about 27 colleges supported by the states, and the 32 institutions founded by church groups or private philanthropies and represented by the United Negro College Fund.

Separate but Equal?

The state-supported colleges were established between, roughly, 1865 and 1890 to parallel the developing land-grant and other state institutions for white students. In competition with white institutions for state funds, Negro institutions have usually received the dregs—an average of 5 to 10 percent of a state's appropriation for higher education. In Mississippi, for example, a state whose white institutions are not regarded as educational Edens, the system has produced the following disparities: in 1962, Mississippi's five white senior colleges had a plant value of $69 million, an educational and general income of $23 million, and an enrollment of 18,467 students. In four of the five schools, tuition was free. Graduate work was available to the state's white students in every subject from accounting and aeronautical engineering to poultry husbandry and zoology. There were also professional schools in law, medicine, pharmacy, engineering, and nursing.

In comparison, the plant value of Mississippi's four Negro public colleges is $8.5 million; their general income, $2.5 million; their enrollment (in 1962), 4183 students. (The Negro colleges thus receive less than half as much money for each student as white colleges.) Tuition is charged in three of the colleges. The only graduate work available is for the master's degree in education.

Nor have the private and church-related institutions, largely established by missionary and philanthropic groups in the period immediately following emancipation, fared much better. Until this year, when it received generous grants from foundations plus the attention of a committee of businessmen in the North, the United Negro College Fund was able to give only $70,000 annually to each of its members. A year's hard work by a college president in soliciting from friends in the town, alumni, church groups, and others may add only $20,000 to his coffers. Yearly budgets for these institutions have been as low as $200,000 to $400,000.

Many other problems follow from the financial ones. A figure for presidential salaries is hard to establish because many college presidents simply take whatever is left over when all the bills are paid, but the average is thought to be around $8000. Salaries for full professors average about $1000 lower. According to the American Council on Education, the combined library facilities of all the Negro colleges are smaller than the facilities of any of a dozen state university libraries. Federal research grants are nonexistent, as are scholarships and fellowships. Buildings and grounds are in bad shape.

Other educational difficulties are related as much to the general pattern of segregation as to financial deprivation. Teachers and students alike are most often the products of inferior segregated education in the South. Almost without exception, students admitted to the Negro colleges require 1 to 2 years of remedial work before they can begin to study on the college level. Pride, poverty, and tradition have all played a role in keeping remedial work at a minimum—pride, because the colleges have been involved in a painful conflict between the attempt to maintain recognizable academic standards (thus keeping up the pretense of equality with white institutions) and the necessity of filling in the holes left by earlier neglect; poverty, because educators have lacked the resources and skill necessary to devise adequate remedial materials, and the students, pressed for money, have lacked the time needed to master them; and tradition, because until recently it never occurred to anyone that you could have both remedial work and a full college schedule if you gave up the idea that college requires 4 years only.

One result of the combination of artificial "standards" and the absence of remedial opportunities has been a phenomenally high dropout rate, thought to average around 70 percent. Another is the fact that a degree from a Negro college is not usually acceptable for entrance to white graduate schools, and few Negroes have had any opportunity for advanced work. Including Ph.D.'s in education, the principal field in which Negroes have been allowed to advance in the South, the number of Negro Ph.D.'s is thought to be between 1200 and 1500. Finally, it is becoming more obvious that segregation has suppressed the ambition and talent of Negro youngsters, and the smallness of the number of students attending the Negro colleges—they currently enroll approximately 115,000 students—is coming to seem more a reason for improvement than an excuse for inaction.

Role of Government

A major impetus for the involvement of established colleges and universities in the problems of Negro education was a meeting of educators called by President Kennedy in the spring of 1963. At that time, partly in anticipation of the "March on Washington," the President was meeting with leading representatives from many groups, including business, labor unions, and the legal profession, and telling them, according to several reports, that "the lid was about to blow off" on the racial situation, and that they had all better figure out ways to contribute to increasing opportunities for Negroes. Aside from such encouragement, however, the government's role has been very limited. Independent educators and universities have supplied most of the initiative, and the major foundations most of the funds, for all of the current efforts.

The first coherent statement of the problems of the Negro colleges was produced last August, by a private group growing out of the government's advisory Panel on Educational Research and Development. (The panel is headed by Jerrold Zacharias, an M.I.T. physicist best known for his efforts to promote reform of the physics curriculum.) A draft report called "Program for Negro Colleges" was prepared by Samuel Nabrit, president of Texas Southern College; Stephen White, an officer of Educational Services, Inc., a nonprofit corporation in Watertown, Massachusetts, which has close links with M.I.T. and with curriculum reform movements; and Zacharias. The American Council on Education shortly afterward began formally to encourage its member colleges and universities to interest themselves in the problem, and it is serving as a clearinghouse for information on all activities and a spon-

sor of some of them. But the Nabrit-White-Zacharias proposals came first, and they serve as the unspoken point of reference for much of what is now going on.

The core of the Nabrit-White-Zacharias plan is that first priority should be given to upgrading the faculties and the level of teaching at Negro colleges, and that this should be done through a nationwide effort drawing intensively on the skills and resources of established universities. In one direct link between civil rights and curriculum reform, the report, stressing the inadequate preparation of students and the need for remedial work, suggested the development of new teaching materials for use in the first 2 years of college, and the establishment of summer institutes where teachers could improve their own skills and be trained in teaching techniques. For advanced college training, the report suggested the establishment of links between flourishing and underprivileged colleges and universities which would permit the two-way exchange of faculty members, and thus doubly contribute to strengthening the weaker institution. In effect, both these programs have been begun.

Summer Institutes

Despite the liabilities of a late start, financial uncertainties, and jurisdictional confusion, five institutes for the training of teachers from 70 Negro colleges are operating this summer. The five include physics (Princeton), mathematics (University of Wisconsin), biology (University of North Carolina, Greensboro), English (Indiana University), and history (Carnegie Institute of Technology). The institutes are being supported by grants from the Carnegie Corporation ($255,000) and the Rockefeller Foundation ($150,000). The institutes were planned by an ad hoc committee of the American Council on Education headed by Mina S. Rees, dean of graduate studies of the City University of New York, and including Zacharias, Samuel Nabrit, Roger Heyns (academic vice-president of the University of Michigan), Samuel Proctor (former president of North Carolina Agricultural and Technical College and now associate director of the Peace Corps), Herman Branson (head of the physics department of Howard University), J. C. Warner (president of Carnegie Tech), Stephen J. Wright (president of Fisk), and Martin Jenkins (president of Morgan State College). Educational Services, Inc., is administering the program.

The institutes are being taught for the most part by members of the faculty of the host colleges, who are paid for their work under the grant. The participating teacher-students from the Negro colleges, chosen by their college presidents, are receiving $105 per week for room and board, plus travel and other expense allowances.

The institutes are varied. Some are organized according to the level of skill of the participants, others on a geographical basis, in the hope that contacts among the members will continue when the program is ended. In history, participants are spending half their time studying major themes of American history, the other half experimenting with new techniques and materials to take back to their own students. In math, participants are studying the modern approach to the teaching of geometry, algebra, function theory, matrix algebra, and finite mathematics. The physics institute is using, among other things, the materials developed by the Physical Sciences Study Committee (PSSC) and the PSSC advanced topics materials. The biology institute, too, is using newly prepared teaching materials, and the English institute is concentrating on composition and literature. In all institutes, partcipants will hear lectures and take part in colloquia with some of the top scholars in their fields, and the physics institute, for example, will visit the Princeton-Pennsylvania 3-Bev Proton Accelerator and other laboratories and installations—opportunities usually denied them in the South.

Although everyone involved is conservative about drawing premature conclusions, the impression at this stage—when most of the institutes are still in session—is that, while not without flaws, they have been gratifyingly successful in communicating ideas and teaching skills to the Negro teachers, and in overcoming some of the feelings of inferiority which have often interfered with relations between Negro and white professionals. "Most of the 'students' here," said an instructor at one of the institutes, "have been struggling alone for years to communicate things half-forgotten or ill-understood to unprepared students. This is the first time anyone has paid any attention to their problems in years, and they are fascinated and grateful."

Although there are no concrete plans at present, planners of the institutes hope to be able to continue and expand them next summer—perhaps persuading the government to foot the bill—and they are also considering establishing "refresher programs" for winter vacations, and other follow-up activities.

Related to the institutes, and engineered by the same group, is a "writing conference" of educators and specialists in English and math which is meeting from June through December in Wellesley, Massachusetts, to prepare teaching materials to be used for the crucial period of high school to college transition. The next step will be to set up regional centers throughout the South to use the materials. One plan, at present, is to use the facilities of local universities, working with high school students on Saturday mornings throughout their senior year, to help prepare them for college level work. A similar program, but one starting with kindergarten, is about to be begun by the Southern Association of Colleges and Schools and the College Entrance Examination Board. The Southern Association expects to set up project "centers" in at least five southern cities which would tie together the Negro and white universities of the area and selected public schools in a massive effort to improve teaching, provide learning materials, assist students financially as well as psychologically to stay in school, and provide guidance counseling for parents as well as students. The first $1.5 million for the program, which is expected to cost about $20 million over 5 years, has been given by the Ford and Danforth foundations.

Exchanges

Whether stimulated independently or by the suggestion in the Nabrit-White-Zacharias paper, a number of northern institutions are in the process of working out details of broad exchanges with southern colleges and universities, expected to get under way within the next year. Although small-scale exchanges of students have been occurring for some time, and professors from the North and West have occasionally attached themselves to Negro colleges in the South, for the most part the contacts have been minimal. Even now, several of the exchanges will not be too significant, but at least three that have been announced so far represent massive commitments on the part of the

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wealthier institutions to the poorer ones: Brown University and Tougaloo College (outside of Jackson, Mississippi); the University of Michigan and Tuskegee Institute; and the University of Wisconsin and three southern colleges, Texas Southern, North Carolina College at Durham, and North Carolina A & T.

The University of Wisconsin exchange program, which is financed by a $300,000 grant from the Carnegie Corporation, will involve exchanges of faculty members for periods ranging from 1 week to a full year. Faculty members from Wisconsin will serve on combined teams to work on curriculum revision, new teaching techniques, in-service training, and a host of other academic problems. Faculty members from the Negro colleges will do some teaching, complete work for advanced degrees, and generally study the academic life of Wisconsin. The Brown-Tougaloo exchange is basically similar but also involves exchange of administrative personnel, and the university has, in effect, committed itself to active fund-raising for Tougaloo to help the poorer college improve its facilities.

Courage, and Convenience

There should be no doubt that these exchanges will pose difficulties for both sides. Relations between the Negro colleges and southern state legislatures are extremely delicate. The colleges involved in the North Carolina-Wisconsin exchange are almost wholly dependent on the state for funds. Even a private institution such as Tougaloo is dependent on the good will of the state for the licensing of its graduates to serve as teachers in Mississippi schools—and in the case of Tougaloo this "good will" is already heavily damaged by the proclivity of the college's students and staff to engage in civil rights demonstrations. Local white politicians, embarrassed and angered by this latest manifestation of northern carpetbagging, have tried in some instances to dissuade Negro college administrators from the exchanges. Without question, the colleges' persistence is an act of courage and commitment.

For the northern universities, the problem is not so much one of courage as of convenience. For the exchanges to work, departments and administrations must actively encourage their best faculty members to leave the campus for a semester or year, sometimes—especially at first—without sufficient notice to plan for replacements. In addition, the colleges have to devise ways of utilizing the southern professors who come to their campuses, again with as little disruption as possible to their regular programs. How these problems will be worked out is not yet clear. But other institutions who are considering exchanges, and the U.S. Congress will be watching the first ones closely. Congress now has before it a proposal by Representative Edith Green (D–Ore.) to provide $5 million annually for a "Domestic Faculty Exchange Act" which would establish programs similar to those described on a broader scale. The House Education and Labor Committee is expected to begin hearings on the proposal shortly.

In addition to the institutes and the exchanges, a myriad of other projects have been begun, concentrating on improving the quality of Negro education at all levels, with a view toward raising the beginning level of college students and increasing scholarship opportunities for Negro students at established institutions throughout the country. Not all the programs are perfectly planned or represent the most sensible allocation of funds, and some will have little permanent impact. Several colleges and universities in the North, for example, hastily initiated summer sessions for neighboring Negro students, without preparing teaching plans (or teachers) very different from the daily grind the students reject, and without developing guidance programs to follow through on whatever summertime progress was made. At least one major northern university, to take an example of a different sort, put three full-time staff members (and considerable effort and money) on the job of recruiting talented Negro undergraduates last year—and managed to produce only 16 students, all of whom, it was thought, would have ended up in a fairly good college anyway.

Despite occasional mistakes and some confusion, however, there is no doubt that what is going on represents a massive and purposeful attack on problems until recently very poorly understood. A point not at all neglected by the educators and specialists who have been developing the new programs is that while they have much to teach, they also have much to learn.—ELINOR LANGER

Announcements

The **Commission on Undergraduate Education in the Biological Sciences** has moved from Washington University, St. Louis, Mo., to Washington, D.C. Correspondence may be sent to V. A. Greulach, Executive Director, George Washington University, 2023 G St., NW, Washington, D.C. 20006.

The U.S. Public Health Service has announced a change in deadline dates for the receipt of applications for **research grants**. The new dates, effective 1 January 1965, have been established to allow more time for staff review of applications before they are presented to the nonfederal advisory review panels.

The new deadlines for new and supplemental applications are: 1 October, 1 February, and 1 July. The respective council/committee meetings are: March, June-July, and November.

The new deadlines for renewal applications are: 1 September, 1 January, and 1 June. The respective council/committee meetings are: March, June-July, and November.

No deadline changes have been made for noncompeting continuation applications or for applications for other types of support.

Meeting Notes

Papers are invited for presentation at a symposium on the **inelastic scattering of neutrons**, scheduled 15–19 December in Bombay, India. It will be sponsored by the International Atomic Energy Agency. The topics for discussion will center around experimental and theoretical studies, including experimental techniques and facilities, dynamic properties of solids and liquids, molecular energy levels and molecular motion, neutron interaction with gases, and dynamics of magnetic systems. Abstracts of 250 to 350 words are required. Deadline for abstracts: *20 September*; for completed manuscripts: *9 October*. (J. H. Kane, International Conferences Branch, Division of Special Projects, U.S. Atomic Energy Commission, Washington, D.C. 20545)

About 55 papers will be presented 15–17 October during the second international conference on **beryllium** metallurgy and technology. The meeting will take place at the Franklin Institute, Philadelphia, and will include sessions on purification and alloying studies, physical metallurgy, process metallurgy, and design and application of beryllium structures. (D. A. Parks, 345 E. 47 St., New York 10017)

Scientists in the News

B. Theodore Cole, biology professor at the University of South Carolina, has been appointed head of the department.

Robert H. Felix, director of the National Institute of Mental Health since 1949, has been appointed professor of psychiatry and dean of the medical school at St. Louis University. He will retire from NIMH 1 October.

Ryukichi Sawada, physics professor at Kyushu University, Japan, has joined the National Center for Atmospheric Research, Boulder, Colorado, as a visiting scientist in atmospheric studies, until next April.

John O. Corliss, professor of zoology at the University of Illinois, has been appointed head of the department of biological sciences at the university's new college of liberal arts and sciences, Chicago, as of 1 September.

Milton R. J. Salton has been named professor and chairman of the department of microbiology at New York University's medical school and postgraduate medical school. He has been a professor of microbiology at the University of New South Wales, Sydney, Australia.

Bodil Schmidt-Nielsen, associate research professor in zoology and physiology at Duke University, will become professor of biology at Western Reserve University in September.

Planned Parenthood-World Population recently appointed **Frederick S. Jaffe** vice president in charge of program planning. He had been director of special program development and associate director of information and education.

Erratum: The ranges of the Beckman IR-10 and IR-12 spectrophotometers ("What's new in research instruments," 15 May, p. 894) should have been described, respectively, as 4000 to 300 cm^{-1} and 4000 to 200 cm^{-1}.

Erratum: In the book review by G. E. Erikson (*Science*, 17 July, p. 256), the sentence in line 4, column 3, page 256, should read "Andrews reviews a whole universe *of behavior* in 'The displays of the primates'. . . ." Line 8, column 1, page 257, should read "the task of relating karyotype *to* taxonomy."